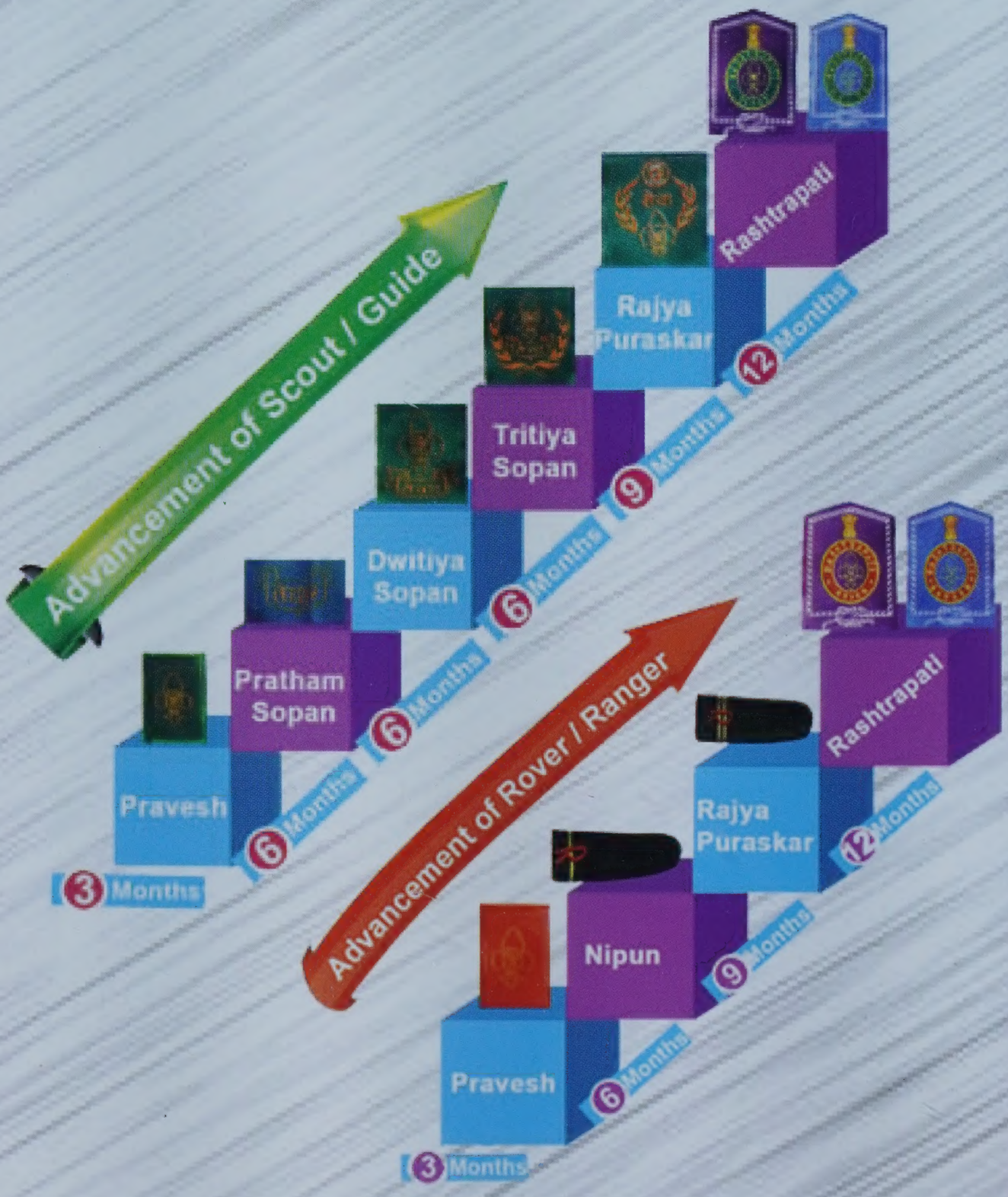
THE BHARAT SCOUTS AND GUIDES

Creating - Better India

FIRST AID MANUAL

BULBUL
ADVANCEMENT
Golden Arrow
Heerak Pankh
9 Months
Swarna Pankh
9 Months
Rajat Pankh
3 Months
Komal Pankh
3 Months
Pravesh
3 Months
Bulbul Aspirant

CUB
ADVANCEMENT
Golden Arrow
Chaturtha Charan
9 Months
Tritiya Charan
9 Months
Dwitiya Charan
3 Months
Pratham Charan
3 Months
Pravesh
3 Months
Cub Aspirant


Advancement of Scout / Guide
Rashtrapati
Rajya Puraskar
12 Months
Tritiya Sopan
9 Months
Dwitiya Sopan
6 Months
Pratham Sopan
6 Months
Pravesh
6 Months
3 Months
Advancement of Rover / Ranger
Rashtrapati
Rajya Puraskar
12 Months
Nipun
9 Months
Pravesh
6 Months
3 Months

FIRST AID MANUAL

BY
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THE BHARAT SCOUTS AND GUIDES
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FORWARD

Scouting-Guiding is a joyful learning towards a useful citizenship. The spirit of "service towards the society" is one to the basic principles of the movement. A true Scout-Guide must "learn First aid to be efficiently prepared" to serve the fellow citizens in distress / illness. The knowledge of First aid can be useful anytime and anywhere and that's why it is an important part of our youth and adult training curriculum.

I am pleased to mention that a prolong requirement of a complete and detailed book on first aid has been fulfilled by this manual. This First Aid Manual of BSG covers all the important and updated first aid topics & techniques. I am sure that this book will not only be very helpful to all the members of the organisation but also to the other people who want to learn first aid.

I congratulate the author of the book and wish all the readers a good learning experience and happy Scouting-Guiding.

DR. K.K. KHANDELWAL, IAS (RETD.)
Chief National Commissioner

THE BHARAT SCOUTS AND GUIDES

National Headquarters, New Delhi

BSG

SCAN ME

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FROM THE AUTHOR

Scouts and Guides represent the largest and probably the most effective youth movement of the world. The journey of a child towards adulthood through the delicate phase of adolescence is well channelized through the activities of the Scouts and Guides movement. The members of the organization learn by doing to strengthen character, health and skills, and in this process they develop into ideal and productive citizens.

One of the important aspects of Scouts and Guides movement is to help other people and serve the community. First aid is the skill that comes foremost in helping people in illness, injury, calamity or distress. This subject must be thoroughly learned and mastered by all the members of the movement as a timely and effective aid may save one or many lives.

This manual not only covers the first aid techniques with illustrations from the very basic to the Ambulance (man) Badge but also gives more in-depth knowledge of the subject. It is aimed to help the reader in achieving higher standards in training and preparedness to serve the society in peace and in odd times equally.

I extend my sincere gratitude to my family, friends and the Director of The Bharat Scouts and Guides for their cooperation and support.

I dedicate this book to my father Late Sh. Kishan Singh and to all the fellow Scouts and Guides willing to serve the mankind.

Happy Scouting- Guiding.

Dr. Brijender Singh
District Commissioner- Delhi State BSG
Lecturer- St. John Ambulance Brigade/ Indian Red Cross Society

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INTRODUCTION

The injuries and illnesses are inevitable and can occur anywhere-anytime and to anyone. While, the medical help is not available everywhere and at all times, so to bridge this gap between the time of occurrence of incidence and the availability of medical help, first aid comes into picture. A proper management of the scenario through first aid techniques during this time gap is very critical for the survival, stabilization and speedy recovery of the casualty. Remember first aider is not a doctor, so always restrict the help to what you have learned and handover the casualty to medical professionals as soon as possible.

What is First Aid

In case of an injury or illness the immediate help based on medical principles which is given by a trained person, before the medical help is available is called first aid.

Aim of First Aid (Acronym- PPP)

The aim or objective of the first aid includes three aspects and they must be followed in the given order only.

- Preserve life.
- Prevent aggravation or prevent worsening of the condition.
- Promote recovery.

Scope of First Aid (Acronym- DTD)

Scope of first aid is the frame or the limits within which a first aider has to provide the help. The factors of the scope are given below and are to be followed in the given sequence.

Diagnosis

Diagnosis is to ascertain, what has happened to the casualty i.e. what is the injury or disease. All actions of the first aider depend on proper diagnosis. The diagnosis is done with the help of:

- **Signs:** These are the variations from normal condition of the body which a first aider can observe e.g. pale or red skin, dry or clammy skin, rapid or slow pulse, fast or slow breath etc.

- **Symptoms:** These are the complaints of the casualty e.g. pains, thirst, dizziness etc.
- **Scene/ History:** The scene of incident e.g. broken bicycle and a wounded boy suggests that the boy met an accident. Likewise history is helpful e.g. a friend's statement that the unconscious boy had epileptic attack last month.

Treatment

Once diagnosis is done the first aider must immediately treat/manage the casualty according to the injury or illness. The first aider must remember that he is a first aider, not a doctor, so should do only what he has learned. Remember, never overdo the things.

Disposal

It is safe, speedy and swift movement of the casualty to a medical facility. The method used and the promptness of transportation are very important for checking further implications.

Golden Rules of First Aid

1. Approach the casualty as soon as possible.
2. Be calm, methodical and quick.
3. Remove the cause of incidence from the casualty or the casualty away from the cause.
4. Look for the response, breathing, pulse and any bleeding.
5. Determine the priority of first aid measures to be taken e.g. restoration of heart beat, restoration of breathing, stop bleeding and then other injuries etc. in that order.
6. Use first aid equipment else improvise as per requirements.
7. Ensure fresh air by asking people not to crowd around.
8. Reassure the casualty.
9. Do not overdo; restrict yourself to provide first aid.
10. Arrange for transport and medical aid.

Legal aspects of First Aid

In case of an accident/emergency always getting reasonable rescue and immediate medical help is not possible. In such cases proper measures taken by the nearby persons can save lives. But, people hesitate to help

needy people as they fear of getting sued, police enquiry, legal case or hospital expenses etc. This hesitation wastes "Golden Hour" which is the time period lasting for one hour following an accident during which a proper medical help can prevent death.

The 4 major basic legal issues of first aid pertaining to first aider are:

- **Duty of care:** A first aiders must act within the scope of his activity and must perform his tasks to the standard expected of a reasonable competent person. First aiders need not fear legal litigation if care is made in good faith and he did best to avoid further harm using valid action within his skills and limitations.
- **Negligence:** A first aider is unlikely to be sued, still it is important to confine the activities to his level of training and do not carry out any procedures that he is not trained in.
- **Consent:** If the casualty is conscious, always take his consent before treatment. For minors take consent from guardians, where possible.
- **Recording:** It is always good to take notes of incidence and treatment given as it may be required by the authorities or medics.

Good Samaritan Laws

A **Good Samaritan** refers to someone who renders aid in an emergency to an injured person on a voluntary basis. **Good Samaritan laws** are meant to protect those who come to the aid of others who are exposed to grave physical harm or injury, for no other reason than kindness.

The important rights given to Good Samaritans are:

- A Good Samaritan is exempted from civil and criminal liability for any act done to save the life and property of the victim.
- A Good Samaritan cannot be compelled to file an FIR
- A Good Samaritan cannot be compelled to stay at police station or hospital, give any information regarding his own or victim's identity or any other evidence about the accident.
- A Good Samaritan is not to pay any charges for the treatment of the victim

- If a Good Samaritan wants to help in investigation, he cannot be called repeatedly and his statement should be recorded in a single hearing.

So if a first aider gives first aid to an injured within his limits there is nothing to worry about legal matters. Remember helping others gives unmatched pleasure.

How to attend a Scene (Acronym- DRSCABT)

To accomplish any task swiftly there should be a proper sequence of procedure. In any case the approach of a first aider must be very **systematic and prompt.** The first aider must be **calm, confident, alert, compassionate and resourceful**. The following sequence must be followed by a first aider while attending to any injured person.

- **D - Danger**
- **R - Response**
- **S - Summon for Help**
- **C - Compression (circulation)**
- **A - Airway**
- **B - Breathing**
- **T - Transport**

Danger: Safety is foremost so look out for any danger to you, to the casualty and to the people around e.g. falling debris, moving machines, traffic, gas etc. If danger is there then either **remove the danger/cause** or **remove the casualty away from the danger/cause**, before moving further in the procedure.

Response: Check the response of the casualty by using **AVPU** scale:

- ***Alert:*** *casualty is totally alert and responsive.*
- ***Voice:*** *casualty is not totally alert but responsive to voice i.e. answering the questions.*
- ***Pain:*** *casualty is not responding to voice but responsive to mild pain like pinching at ear.*
- ***Unconscious:*** *casualty is not responsive to pain also.*

Check breathing by look, listen and feel method and check pulse by carotid artery(Ref. relevant chapter)

Summon for Help: Call your self or ask someone to call for help e.g. ambulance etc. Always take help from other people.

At his stage:

*IF casualty is **responsive** then diagnose the illness or injury and give first aid accordingly i.e. treatment and disposal.*

*IF casualty is **un-responsive** i.e. unconscious then proceed further to CAB as under.*

Compression: If casualty is unresponsive with no pulse and breathing then give 30 chest compressions in the middle of chest @ 100 to 120 per minute. (Ref. relevant chapter)

Airway: Remove obstacle if present in nose/mouth and clear the airway by head tilt and chin up. (Ref. relevant chapter)

Breathing: Give 2 ventilation i.e. mouth to mouth respirations @ 12-14 per minute; continue CPR (Ref. relevant chapter)

Transport: Arrange safe transport i.e. bring the casualty under medical help as soon as possible. (Ref. relevant chapter)

Personal First Aid Kit

Every house/office/institute must have a first aid kit so that any minor or major mishap can be dealt with promptly. To make a smart and inexpensive first aid kit, collect the requisite contents and put them in a handy bag. If kit will be on the move, a water-resistant and drop-proof bag should be used. The indicative and compulsory contents of a personal first aid box are given under but one can always add to the list.

Contents of Personal First Aid Kit

- Triangular bandages at least 6, Roller bandages (width 2, 3 and 4 inches), Crepe bandage, Adhesive bandages, Sterilized bandages.
- Sterile dressings, Adhesive tape, Cotton.
- Disposable gloves, Face mask, Poly bags.
- Antiseptic lotion and ointment, Hand sanitizer, Soap
- Aspirin Tablets, ORS packets
- Scissors, Forceps, Blade, Bowl, Spoon, Wooden splints
- Thermometer, Ice pack, Torch, Safety pins, Paper, Pen

Always remember a first aid box is not available all the times, so first aider should be resourceful and tactful to provide first aid by improvisation from the available resources.

HUMAN BODY

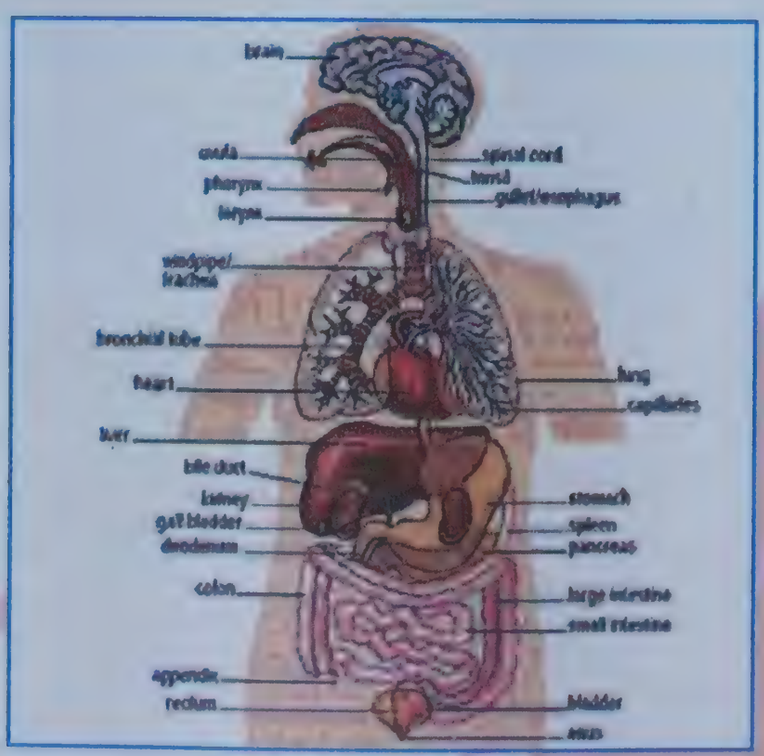
A good first aider must have a basic knowledge about the human body and its functioning. This is required for a better understanding of the reasons behind injuries, illnesses and the underlying medical concepts of the first aid provided.

The human body is the total structure of a human being that makes up a human individual. It comprises a head, neck, trunk (includes the chest and abdomen) and limbs (include the hands and legs). The human body is made up of the building block called a **Cell.** An aggregate of similar cells forming a structural material with a specific function is called a **Tissue.** A group of tissues which perform a specific or similar function is called an **Organ.** In human body many organs work together to perform a certain function of the body and this is called an **Organ system.** Subsequently all the organ systems work together in synchronization to complete and function as a **human body.**

Cell ->Tissue-> Organ -> Organ System -> Human Body

Vital Organs

In human body there are more than 22 organs. There are some organs which are vital for life i.e. without proper functioning of these organs a person's life is in immediate danger.



Brain

The brain is the controller of the human body. It is the organ of thought, emotion, memory, and sensory processing. It serves many aspects of communication and vital functions like circulation of blood, breathing, digestion etc. The brain receives impulses from sensory nerves, which are located throughout human body and respond to pain and other stimulation through motor nerves. It also controls body functions by secreting hormones. It is made of soft tissue and is protected by the skull. The average adult brain weighs 1.25 Kg.

Heart

The heart located in the middle of the chest behind the chest bone (sternum) is the pump house of the body. It pumps oxygenated blood throughout body and receives deoxygenated blood in return. It also circulates blood to lungs for oxygenation of deoxygenated blood. Without heart any organ would not receive oxygen, nutrients and hormones etc. which are circulated to the body through blood. Our heart beats around 72 times per minutes and it varies by age, activity, health status etc.

Lungs

The lungs are located in the chest and are protected by rib cage. They are responsible for taking out oxygen from the inhaled air and transferring it to the blood, then this oxygenated blood is sent to the body through heart. The lungs also remove carbon dioxide, which is exhaled. The process of respiration by lungs is assisted by diaphragm and intercostals muscles attached to the ribs.

Kidneys

Humans have 2 kidneys located under the rib cage in lower back. The job of the kidneys is to filter water, salt and waste products out of the blood and to produce urine. An enzyme, rennin produced by kidney plays a big role in regulating blood pressure. A healthy person can live with one kidney.

Liver

The liver is the largest solid organ of the body located in the upper

abdomen below the diaphragm. The main job of the liver is to produce bile, which it sends to the stomach for digestion. The liver also filters out toxins and regulates blood sugar by storing sugar and releasing them when more sugar is needed in the blood. The liver is also takes care of releasing cholesterol, breaking down fats, and producing blood proteins. It is the only organ which can regenerate itself.

Stomach

It is a J shaped organ located on the left side of the abdomen, below the left part of the liver. The stomach receives food from the food pipe ending i.e. oesophagus and sends it into the small intestine. The stomach's role in digestion is to break down food and mix it with digestive juices or enzymes which it secretes itself and also which it gets from liver and pancreas.

Pancreas

The pancreas is located in the abdomen, behind the stomach. It produces enzymes necessary for digestion and sends them to the stomach. The pancreas also produces insulin which regulates blood sugar. It also creates glucagon which has the opposite effect of insulin and also helps to maintain blood sugar levels.

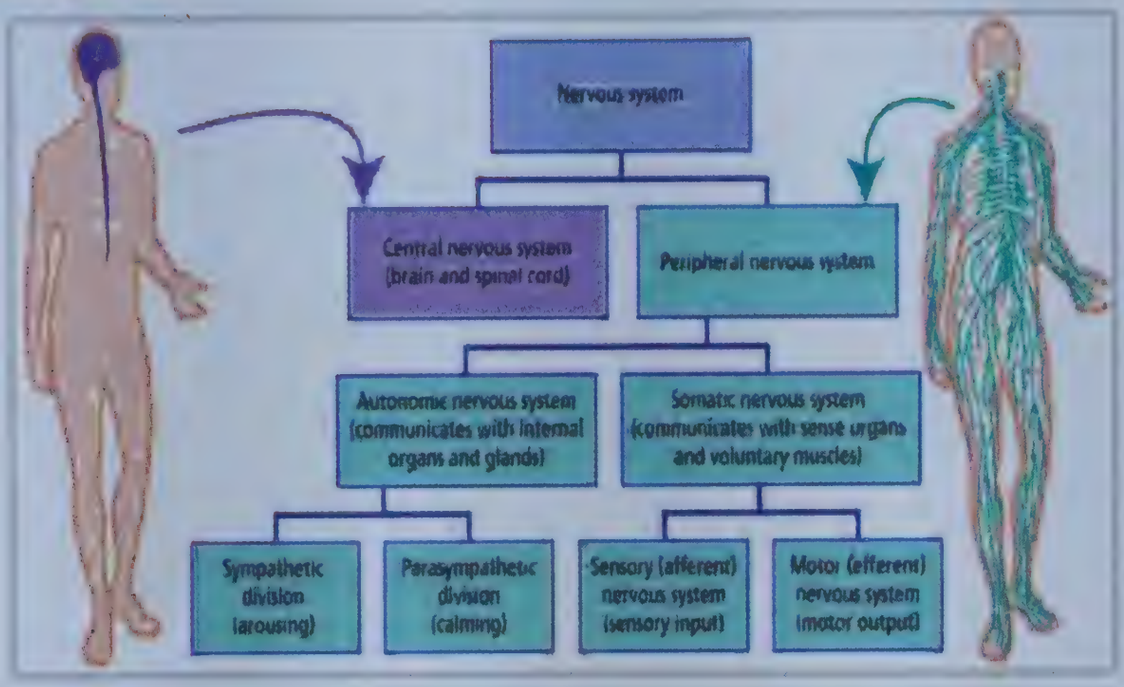
Skin

The skin is the largest organ in the human body which covers the entire body and provide it shape and protection. It's another job is to maintain body temperature by sweating (to cool) and by goose bumps (to trap heat). Skin has sweat glands, oil glands and nerve endings. There are about 1.9 crore skin cells in every square inch of the human body.

Organ systems

In humans and in many other animals and plants many organs work together in synchronization to complete a specific body function e.g. circulation of blood is performed by the circulatory system, which includes the heart, arteries, veins and capillaries. Human body consist of following major biological organ systems that carry out specific functions necessary for everyday living.

Nervous System

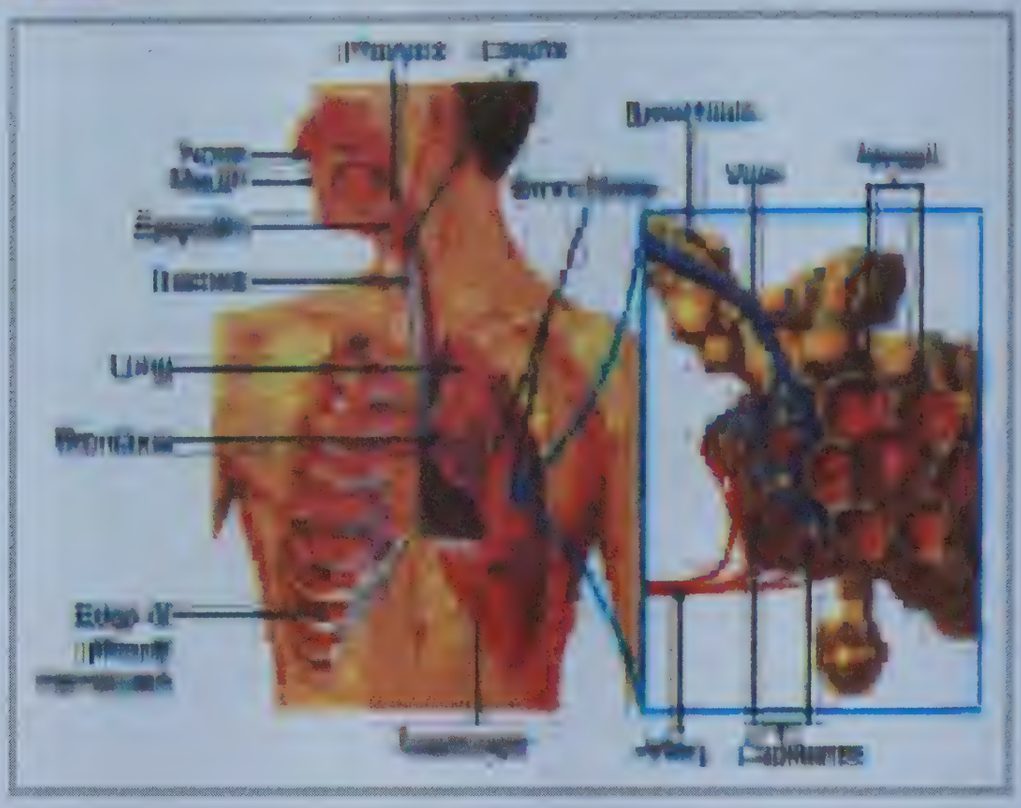

Nervous system
Central nervous system (brain and spinal cord)
Peripheral nervous system
Autonomic nervous system (communicates with internal organs and glands)
Somatic nervous system (communicates with sense organs and voluntary muscles)
Sympathetic division (arousing)
Parasympathetic division (calming)
Sensory (afferent) nervous system (sensory input)
Motor (efferent) nervous system (motor output)

The nervous system is the messaging and signaling system of the body. It controls both **voluntary actions;** which we do at our will e.g. waving hand and **involuntary actions;** which we can't control e.g. digestion. The nerve cells are called neurons, which together form the nerves and then ganglia which in turn form the brain and related structures.

Structurally the nervous system is divided into two parts: the **Central Nervous System (CNS)** composed of the brain and the spinal cord and the **Peripheral Nervous System (PNS)** composed of the nerves and ganglia outside the brain and spinal cord. The CNS is mostly responsible for organizing motion, processing sensory information, thought, memory, cognition and other such functions. The PNS is mostly responsible for gathering information with sensory nerves and directing body movements with motor nerves.

Functionally the nervous system is divided into two parts: the **Somatic Nervous System (SNS)** and the **Autonomic Nervous System (ANS).** The SNS is involved in voluntary functions like speaking and sensory processes. The ANS is involved in involuntary processes, such as digestion and regulating blood pressure. ANS is further divided into **Sympathetic Nervous system** (fight or flight response) which is responsible for the body's reactions to stress, injury, or perceived threat while, **Parasympathetic Nervous system** (rest and digest response) is responsible for controlling the homeostasis (stable state) of the body.

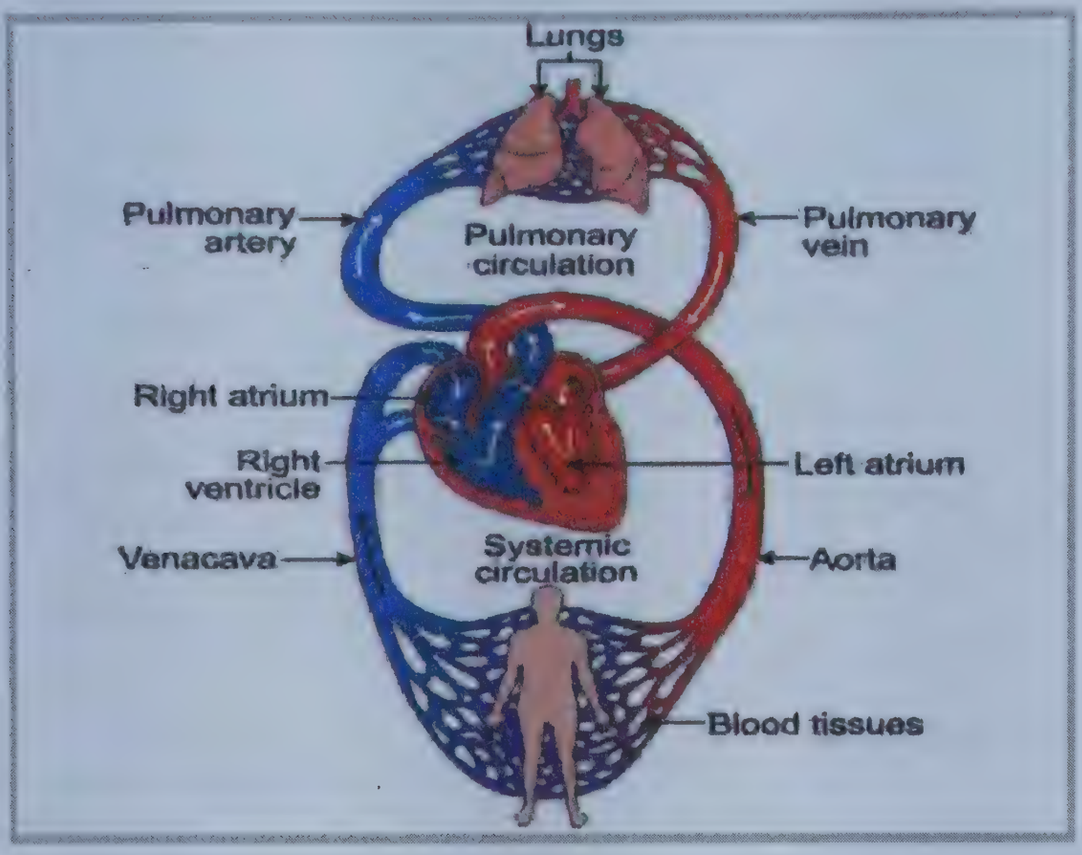
Respiratory System



The respiratory system allows us to inhale vital oxygen and exhale carbon dioxide in a process called breathing. The respiratory system consists of the nose, trachea, lungs and diaphragm. First, air is inhaled by nostrils or mouth and passes through the trachea into the lungs. To facilitate this process the diaphragm is pushed down, which creates a vacuum. The lungs have a large numbers of alveoli which are small air sacs with capillaries. In the lungs air is briefly stored in alveoli before being expelled from the lungs when the diaphragm contracts again. During this brief storage of air each alveolus absorbs oxygen out of the air through its capillaries, and passes it into the bloodstream. This system is very important as without respiration human body can't survive for a few minutes.

Circulatory System

The circulatory system transports blood, nutrients, oxygen and hormones throughout the body and also carry carbon dioxide and waste material for elimination from the body. It consists of the heart, blood and blood vessels (arteries, capillaries and veins). Though, not a part of circulatory system but our lungs also play an important part in

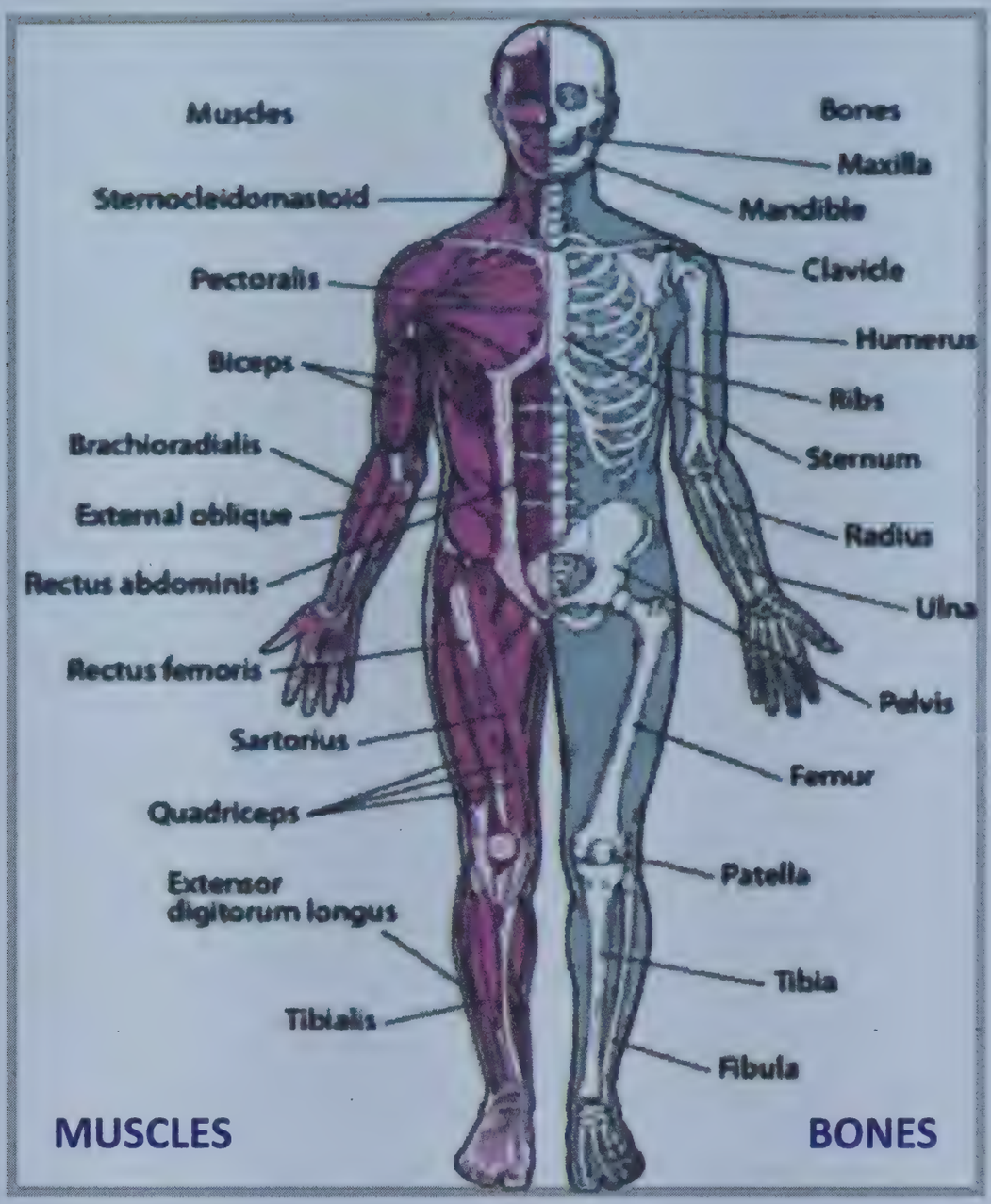


the system. The blood circulation within the human body can be divided into two circuits: the **pulmonary circuit,** in which heart pumps blood to the lungs to receive oxygen and leave carbon dioxide and the **systemic circuit,** which carries blood from the heart to the rest of the body and back. The circulatory system is vital as our body cannot survive for more than 5 minutes without supply of oxygen facilitated by it.

Musculoskeletal System

The musculoskeletal system gives basic structure to the body and the ability for movement. It consists of the human skeleton having **bones**(rigid tissues), **ligaments** (tissues which connect bones to other bones), **tendons** (tissues which connect bones to muscles), **cartilages** (soft boney tissues covering ends of the long bones) and **attached muscles.** It can be split up into the **muscular system** and the **skeletal system.**

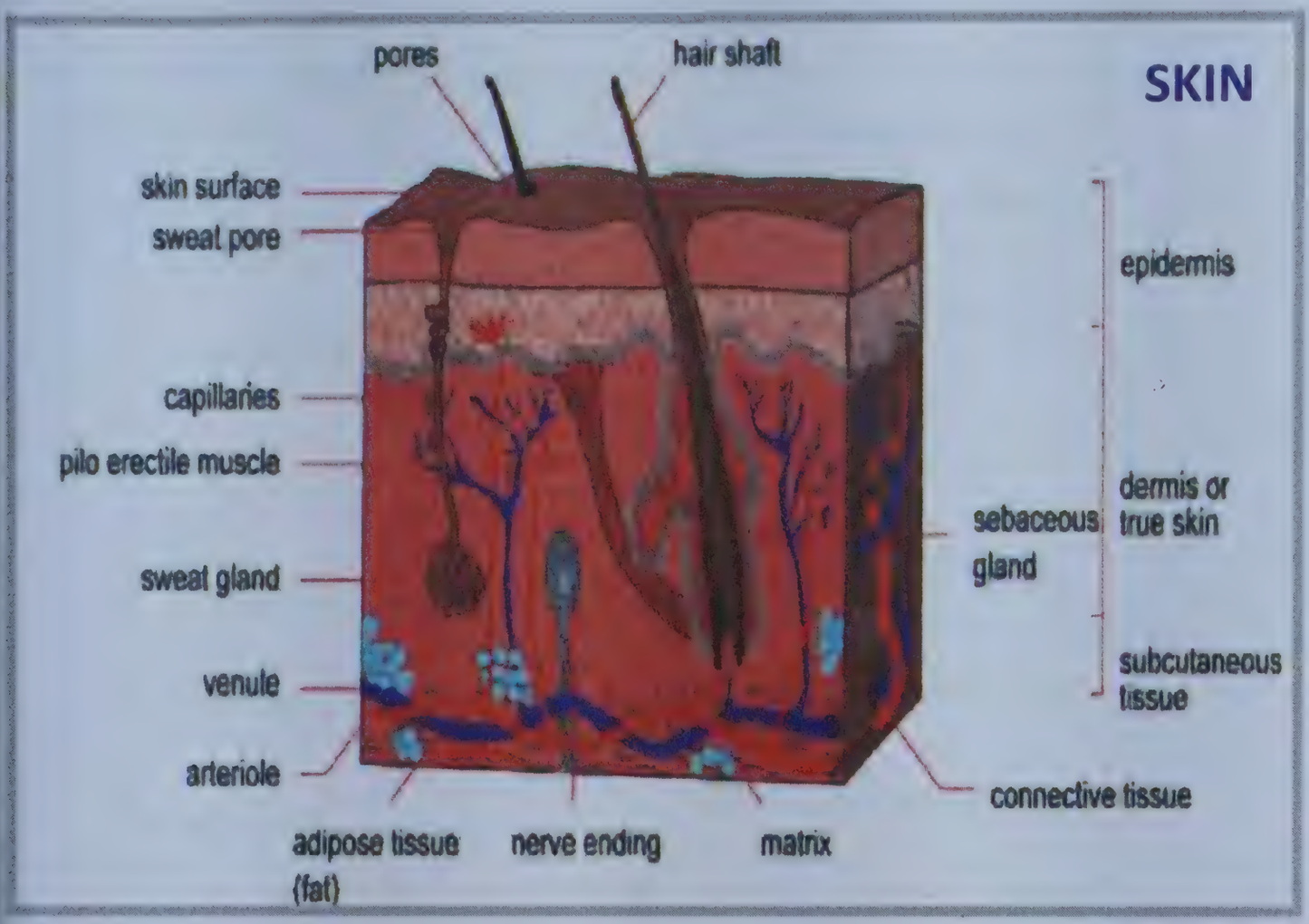
The human **Muscular system** consists of about 650 muscles to make the movements possible along with blood flow and other bodily functions. There are three types of muscle: **Skeletal muscles** are connected to bone and helps voluntary movement; **Smooth muscles** are found inside organs and helps to move substances through organ, and **Cardiac muscles** are found in the heart and help pump blood.



The **Skeletal system** provides frame, movement, protection and support to the body. It consists of 206 bones that are connected by tendons, ligaments and cartilages. The larger bones in the body contain bone marrow which produces blood cells. Also, all bones are major storage sites for calcium and phosphate storage. The teeth are also part of the skeletal system, but they aren't considered bones.

Integumentary system

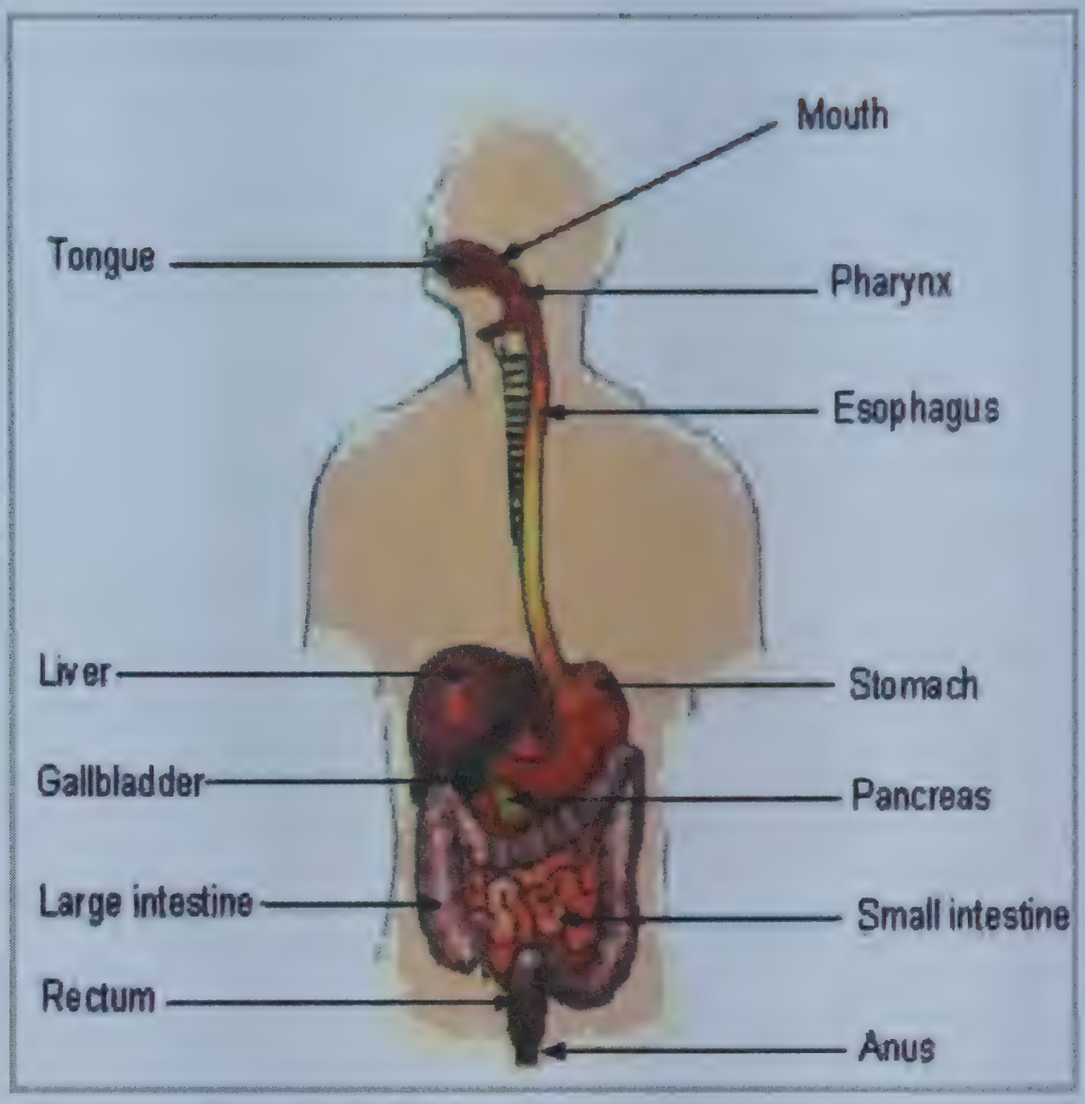
The integumentary system consists of the covering of the body i.e. the **Skin** along with **Hair, Nails** and other important structures such as the **Sudoriferous or Sweat glands** (help to regulate body temperature and eliminate waste as perspiration) and **Sebaceous or Oil glands** (lubricate and protect skin). The skin provides containment, structure, and



protection for other organs, and serves as a major sensory interface with the outside world. It also protects us from the outside world through **nerve endings** and is our first defence against pathogens. Hair also helps in regulating body temperature and protection of the body parts. Nails are tools for defence and attack.

Digestive System

The digestive system consists of a series of connected organs that works together to break down and absorb food, and remove waste. It includes tongue, mouth, esophagus, stomach, small intestine, large intestine, rectum and anus. It also includes the liver, pancreas, gallbladder and salivary glands because they all produce digestive juices. This system converts food into small and nutritional units i.e. proteins, fats, vitamins and minerals. First in the mouth food is chewed and mixed with saliva for easier digestion. Then it is swallowed and reaches stomach via esophagus. In the stomach, food is mixed with gastric acids and other digestive juices from liver and pancreas for the extraction of nutrients. The food moves through the gastrointestinal tract by systematic

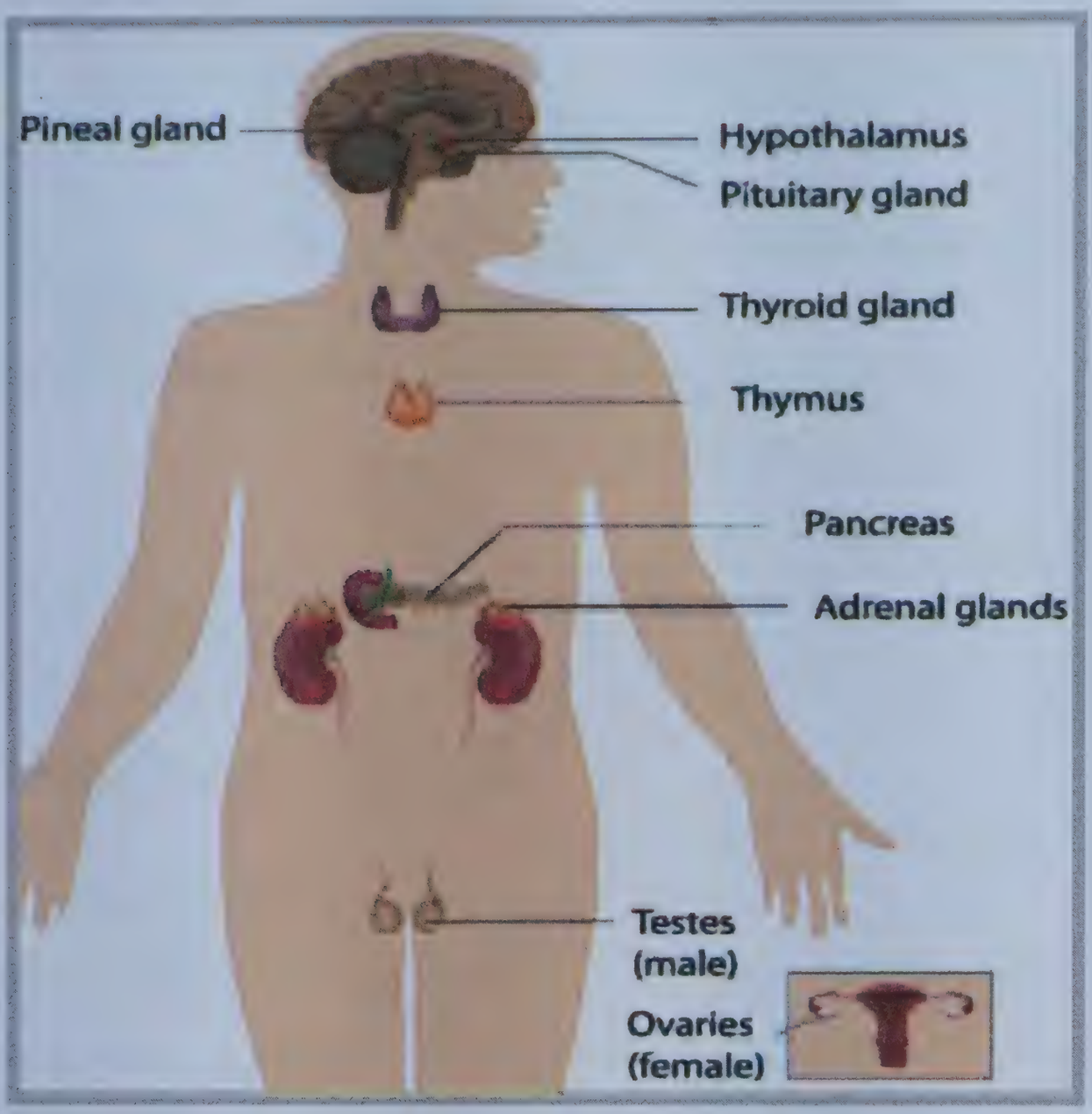


expansion and contraction of muscles to push food from one area to the next. After stomach it reaches the small intestine where the nutrients and water are absorbed . What remains passes on to the large intestine, where it is dried to form faeces and expelled through the anus.

Endocrine System

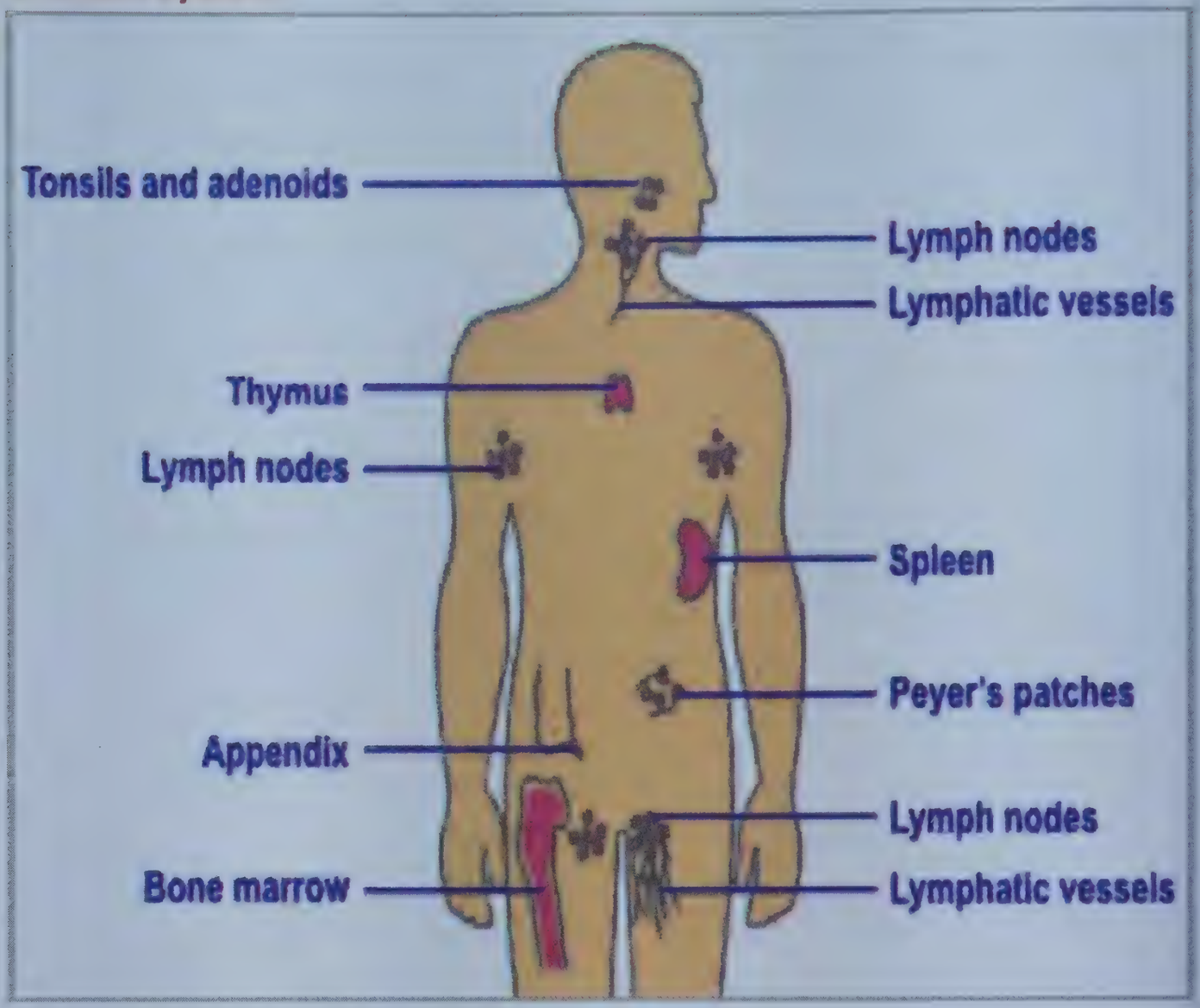
The endocrine system consists of glands that secrete hormones into the blood. The endocrine hormones are chemical signals from one body system to another to bring about variety of changes. These hormones travel to different tissues and regulate various functions e.g. metabolism and growth. As such many organs/tissues produce specific endocrine hormones. The main endocrine glands are

- **Hypothalamus:** It is a part of the brain and is the primary connection between brain and all other endocrine glands.
- **Pituitary:** It is pear shaped and situated in brain also called master gland. It takes signal from hypothalamus and releases hormones to other glands.



- **Pineal:** It is situated in the brain and produces metabolism.
- **Thyroid:** It is situated in the front of the neck. It regulates metabolism rate and protein synthesis.
- **Thymus:** It is situated behind the breast bone and stimulates production of T- cells. It decays during puberty.
- **Adrenals:** They are situated above kidneys and produce hormones to stimulate production of glucose in liver, release sex hormone- androgen and increase breath and pulse rate.
- **Pancreas:** It regulates blood sugar level by secreting insulin and glucagon.
- **Testis:** In males they produce sperms and sex hormone- testosterone and estrogen.
- **Ovaries:** In females they produce eggs and sex hormones- estrogen, progesterone and testosterone.

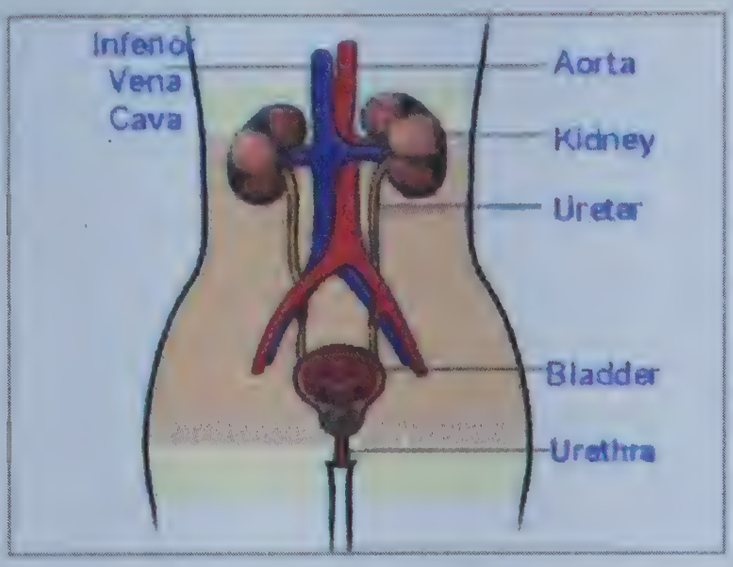
Immune System



The immune system is the body's defence against harmful bacteria, viruses and other pathogens. It includes **White blood cells, Lymph nodes, Spleen, Bone marrow and Thymus.** The immune system distinguishes body cells from outside cells and substances and neutralizes or destroys the latter by using specialized **antibodies.**

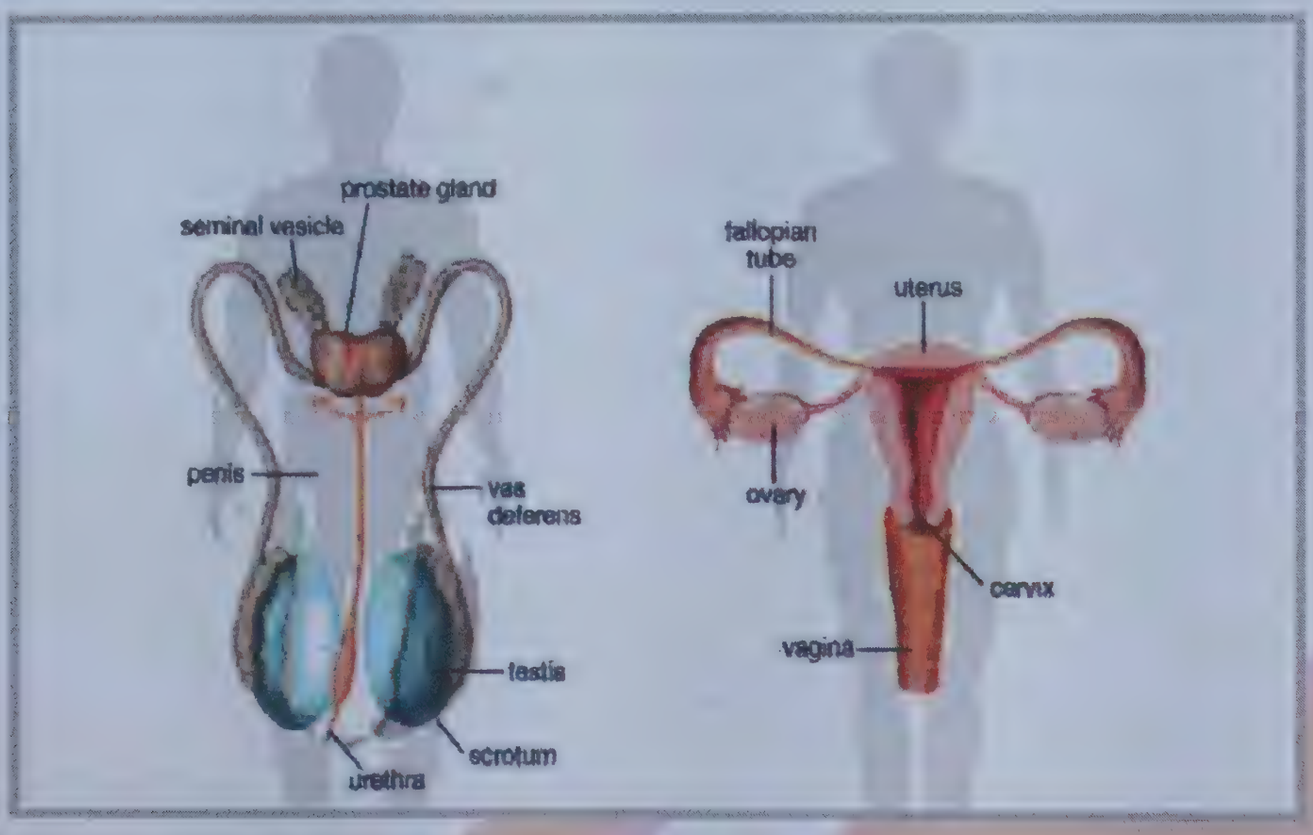
White blood cells are also called **Leukocytes** and they circulate in the blood and lymph. They are stored in **Thymus, Spleen, Bone marrow and Lymph nodes.** WBCs are of two type viz. **Phagocytes** (which eat the pathogens) and **Lymphocytes** (which remember the previous pathogens and destroy them if they re-attack). The lymphocytes are produced in bone marrow, some remains there and they are called **B Lymphocytes (B cells)** while others move to Thymus and are called **T Lymphocytes (T cells).** B cells produce antibodies and alert T cells while T cells destroy invaders and alert other leukocytes.

Urinary System



The urinary system removes toxic materials from the blood to produce urine, which carries a variety of waste, toxins and water out of the body. Urine produced by the kidneys through filtration of blood travels down the ureters to the bladder, and exits the body through the urethra.

Reproductive System



The reproductive system allows humans to reproduce. The male reproductive system includes **penis, prostates, seminal vesicles and the testes,** which produce sperm. The female reproductive system consists of **vagina, uterus, fallopian tubes and the ovaries,** which produce eggs. During conception, a sperm cell fuses with an egg cell, which creates a fertilized egg that develops in to a human baby.

BANDAGES AND SPLINTS

The bandages and splints are the integral part of a first aid kit. We need bandages/splints to properly manage injuries like wounds, sprains and fractures. Needless to mention, learning the skills for proper usage of the bandages and splints is a must for a first aider.

Bandage and its Uses

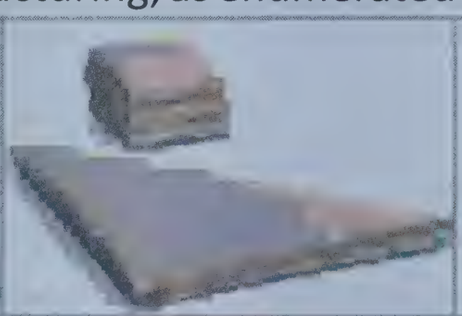
Bandage is a piece of fabric usually a strip in various sizes and shapes, having many uses viz.

- Cover the injured part to avoid further injury and infection.
- Fix the dressing/ splint in its place
- Support the injured part of the body e.g. slings.
- Restrict the movement of the injured part e.g. constriction bandage/ slings.
- Constrict the part to reduce the blood flow/ swelling e.g. constriction bandage.
- Cold compression e.g. given in high fever.
- Hot fomentation e.g. given in sprains.

Types of Bandages

There are different types of bandages based on their shape, use and the material used in manufacturing, as enumerated below.

Roller



Triangular

Constriction/ Crepe

Adhesive

Sterilized

Improvised

Roller Bandage or Gauze

It is a rolled strip of gauge or other material having width ranging from 1 inch to 6 inches. It is the most commonly used bandage as can be applied very conveniently on any part of the body.

Triangular or Cravat Bandage

This is widely used in first aid since it can cover any part of the body in no time. It can also be used to make slings very easily. A cloth piece of 38 square inch cut diagonally, gives out two bandages.

Constriction/ Crepe Bandage

These bandages have elasticity in them so they are used to put pressure, restrict movement, provide compression, control bleeding and reduce swelling at the injured site.

Sterilized/ Adhesive Bandage

It is a bandage which is sterilized with attached dressing to be used on wounds. It may have adhesive coated surface so it sticks to the skin and remain in place. It comes in different shapes and sizes.

Improvised or Emergency Bandage

In case of emergency and non-availability of standard bandages any material which is clean can be used as a bandage e.g. handkerchief, scarf, shirt, ribbon, plastic film etc.

Roller Bandage

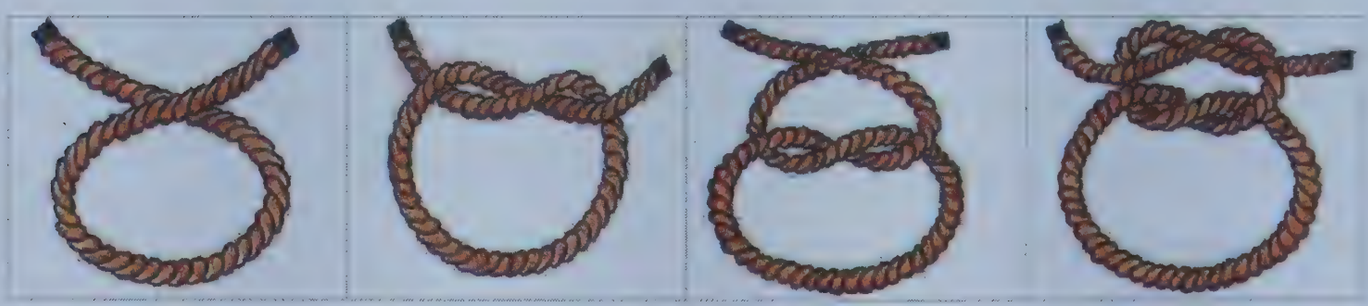
Roller bandage is most widely used as it is easily available and easy to apply. The roll of the bandage is called the **drum** and the open end is called the **tail**. The general rules for applying roller bandage are:

- Wash the hands and put on gloves.
- Apply dressing and then to apply bandage take the drum in the hand opposite to the injured part i.e. if right leg is injured then keep the drum in your left hand.
- Always apply outer side of the bandage roll to the injury
- Fix the bandage with two rounds while starting and also while finishing the bandage.
- Each round must overlap 2/3 part of the preceding round.

- Always move "down to up" and "in to out"on the body part.
- Never open more than 4 inches of the drum while applying.
- Bandage should not be too tight (to disturb circulation) or too loose (to come out easily).
- Finish the bandaging by securing the end of the bandage with **Reef knot**** or adhesive tape.
- Never put knot on the wound.

** **Reef/ Square Knot:** All bandages must be secured using a reef knot. It is flat in shape and does not pinch so comfortable for the patient.

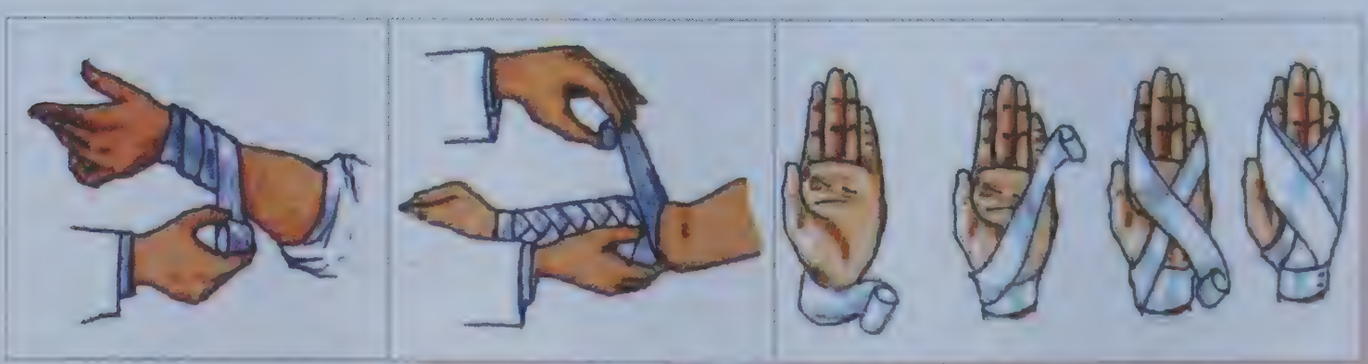
- Wrap the left end of the bandage over and then under the right end to start the knot.
- Wrap the right end over and then under the left end to complete and Pull the knot tightly from both sides.



Reef Knot

Methods for applying Roller bandage

The body part to be covered with bandage may be of equal or unequal thickness or a joint may be injured. There are broadly 3 methods to apply roller bandages depending on the site of the injury.



Simple Spiral ***Reverse spiral*** ***Figure of Eight***

Simple spiral: The bandage is applied spirally around injured part with each successive round overlapping 2/3 part of the preceding round. It's used when injured part is of almost same thickness.

Reverse spiral: This is modification of spiral method where in bandage is half reversed on itself in each round. It keeps the bandage properly seated on injured part which is uneven in thickness.

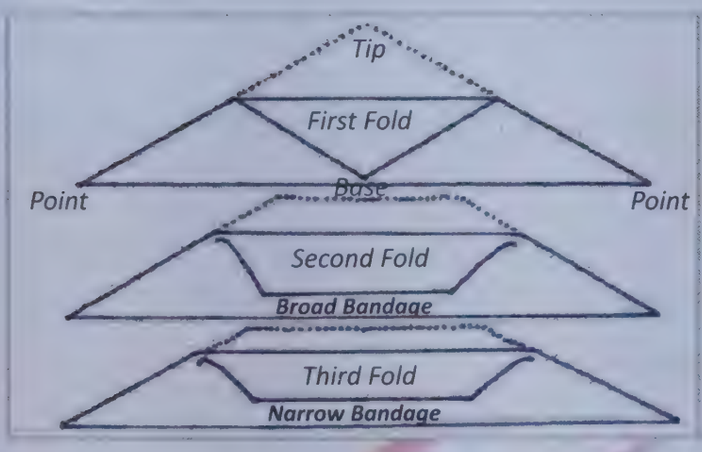
Figure of Eight: The bandage has successive laps over and around each other to resemble the numeric figure Eight. It is applied at the joints as bandage does not slip and facilitates movement.

Triangular Bandage

Triangular bandage can be used in various ways on any body part by folding it differently. Always fold the base of the bandage about 1 inch to secure the uneven lining. Fold the bandage as broad, narrow or as required and follow the applicable general rules used for applying roller bandage.

Triangular bandage can be used as:

- **Open:** In the open form e.g. for slings.
- **Broad-fold bandage:** The apex folded down to the base twice.
- **Narrow-fold bandage:** The broad-fold bandage folded in half.
- **Ring Pad:** The narrow bandage is turned into a loop and then free end is rolled around the loop to make a ring. Ring pad is used on the wound when something is protruding out of the wound. It prevents direct pressure on the protruding object but puts pressure around it to reduce bleeding. After placing the ring pad on wound, bandage is applied.



Folding of Bandage

Making Ring Pad

Methods for applying Triangular Bandage

This bandage can be used to cover any part of the body in no time so it is widely used in first aid /emergency. Always apply bandage after dressing. The various methods to use triangular bandage are as following.

Slings

The Sling is a supportive and restricting bandage to the injured upper limbs for following purposes:

- Give support to the injured part.
- Restrict the movement of the injured part.
- Inhibit further injury and add to the comfort of the casualty.

Arm or Big sling: It is applied when upper or forearm is injured.

Arm sling

How to apply

- Support the forearm parallel to the ground with wrist slightly higher than elbow.
- Place open bandage between the body and the arm, with its tip towards elbow.
- Extend the upper point of the bandage over the shoulder on the uninjured side.
- Bring the lower point up over the arm, across the shoulder on the injured side to join the upper point and tie firmly with a reef knot in the collar bone pit of the injured side.
- Secure the elbow by folding the tip over the elbow and fixing with a safety pin
- Finger tips must be visible out of the sling to observe blood circulation.

St. John or Triangular sling: It is used in case of collar bone fracture or used to keep the hand raised.

St. John/ Triangular sling

How to apply

- Support the casualty's palm on chest with fingers touching the uninjured shoulder.
- Place an opened triangular bandage over the arm with the tip towards elbow.
- Extend the upper point of the bandage over the uninjured shoulder.
- Tuck the lower part of the bandage under the injured arm firmly, bring it under the elbow and around the back and extend the lower point up to meet the upper point at the shoulder.
- Tie firmly with a reef knot in collar bone pit of uninjured side.
- Secure the elbow by folding the tip and applying a safety pin.

Collar and Cuff sling: It is used when forearm or palm is to be kept raised e.g palm bleeding.

Making Clove hitch

Collar and Cuff Sling

How to apply

- Place the injured hand extended towards the shoulder on the uninjured side.

- Form a clove hitch with narrow triangular bandage and gently secure the wrist in it.
- Extend the points of the bandage to either side of the neck and tie firmly with a reef knot in the collar bone pit of injured side. It is not used when wrist is injured.

Scalp: The bandage is used to cover entire skull.

- Stand behind the casualty and keep the open bandage on the scalp with the tip touching the backbone. Now place the bandage base just above the eyebrows and cross both the points of the bandage firmly at the base of the back of neck (sparing the ears).
- Bring the points in front and tightly tie together on the forehead with a reef knot and finally tuck the tip on the back of the head.

Scalp bandage

Forehead: It is used to cover the forehead injuries.

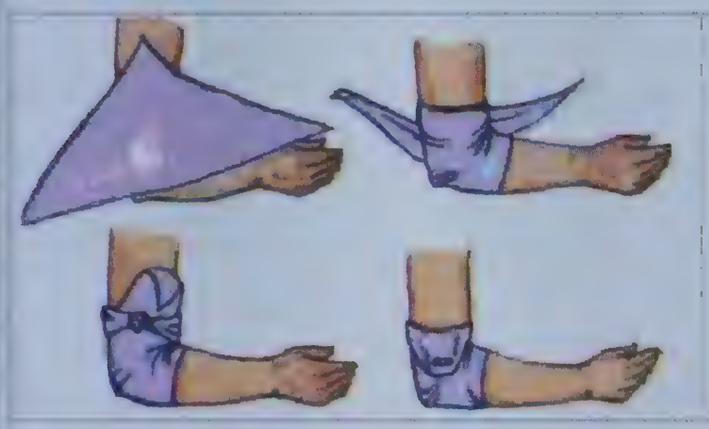
- Stand behind the casualty and put narrow fold bandage on the forehead.
- Take the bandage around the head sparing ears and tie the points with reef knot in the front.

Forehead bandage

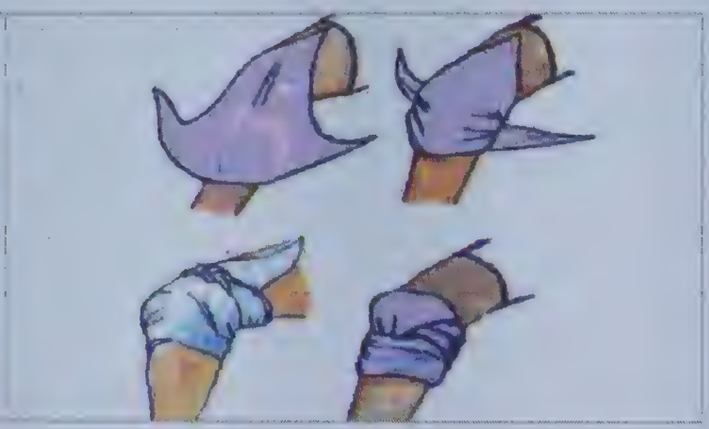
Jaw: This method provides support and pressure to stop the movement of broken jaw. The bandage is folded as narrow and then used.

Jaw bandage

Elbow / Knee: In this method bandage is folded partially and started from below the joint. Keeping tip of the bandage up, cross the points round the knee/elbow and tie points above the joint making figure of eight. The tip is dropped back to cover the knot. It covers the joint and felicitates movement also.

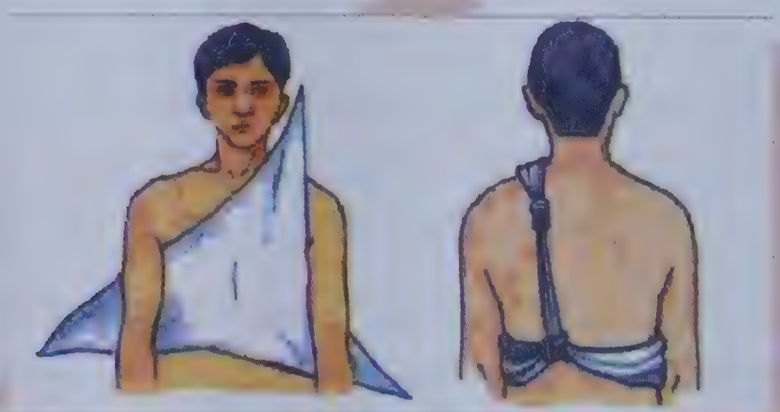


Elbow bandage



Knee bandage

Chest/ Back: The chest can be covered with open triangular bandage by keeping the tip on shoulder and tying points together with reef knots as illustrated below. It can be reversed to cover the back.

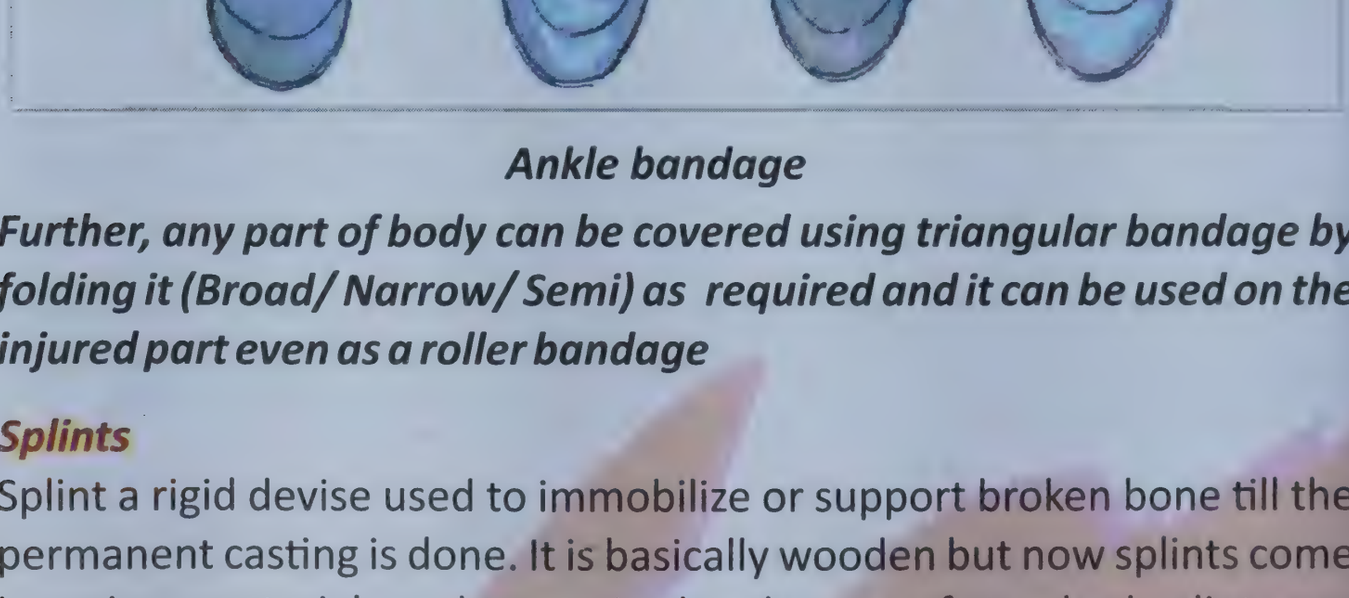


Chest/ Back bandage

Palm/Foot: The below shown method is used to cover foot and palm completely as illustrated .

Palm bandage ***Foot bandage***

Ankle: A narrow folded bandage is used to secure the ankle in case of injury like sprain.



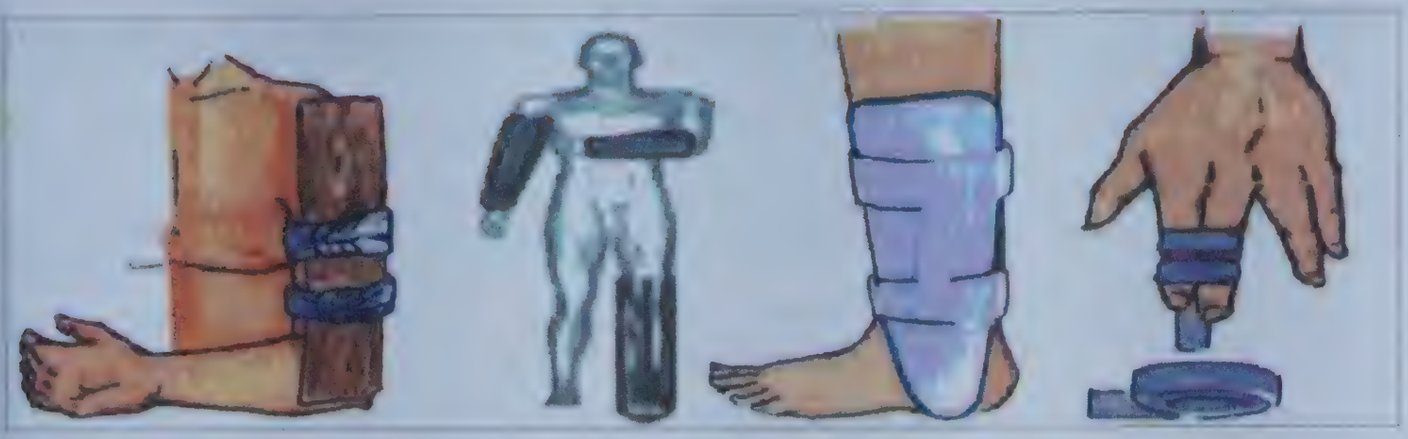
Ankle bandage

Further, any part of body can be covered using triangular bandage by folding it (Broad/ Narrow/ Semi) as required and it can be used on the injured part even as a roller bandage

Splints

Splint a rigid devise used to immobilize or support broken bone till the permanent casting is done. It is basically wooden but now splints come in various materials and types. In the absence of standard splints any stick, shoe, box, roll of newspapers, cardboard etc. can be used.

Wooden: These are wooden plates of various sizes/ shapes and that can be attached together with a jointer. They are the most commonly used splints.



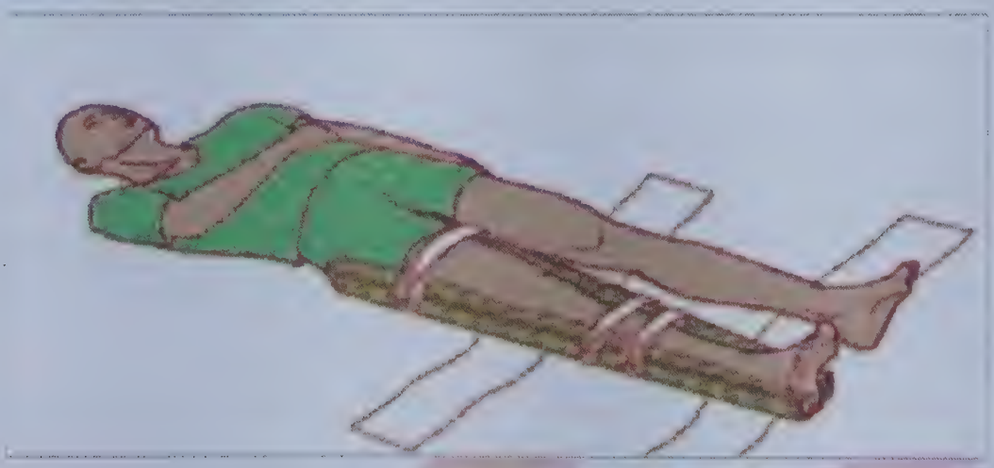
Wooden splints *Vacuum splints* *Customized splint* *Buddy wrapping*

Vacuum: It is a small vacuum mattress that is used in emergency as a temporary splint. Vacuum splints operate by extracting air from the splint itself to enable thousands of polystyrene balls inside the splint to mould around the injured body part similar to an orthopaedic cast.

Customized: These are ready made supports used to provide support to the injured part. They are usually used during the healing for long period of time.

Buddy wrapping: It is bandaging a fractured finger together with a healthy one, which acts as a splint. It is known as natural splint also.

How to apply and Precautions



Bandages passed thought the natural grooves

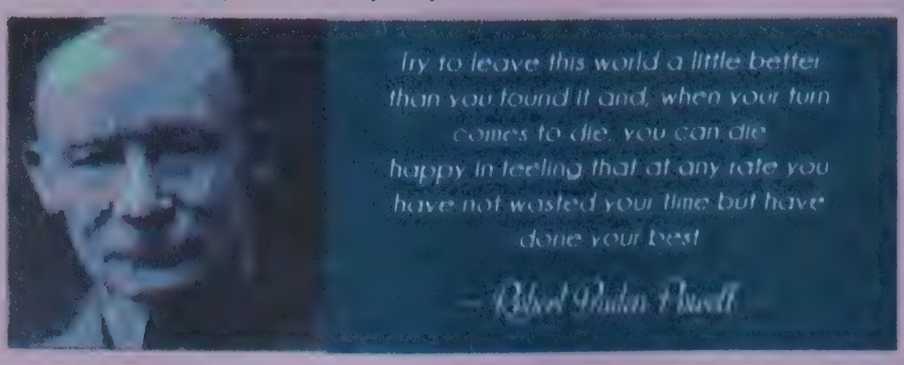
- Splint must be rigid enough to keep the injured part straight and restrict movement.
- Splint must be long enough to cover joints above and below the fracture.
- Splint must be padded to avoid bruising or hurting
- Splint must be fixed by bandage at four places; 1. Just above the

fracture; 2. Just below the fracture; 3. Joint above the fracture; and 4. Joint below the fracture. If bone is longer extra bandages can be applied.

- Splints can also be fixed by wrapping bandage throughout the length of the splint.
- To avoid movement while passing the bandages through underside of the casualty, pass the bandages through the **natural grooves** viz. under the neck, waist, knees and ankles.
- Splints should be tied tight enough to restrict movement of the part but must allow blood circulation.
- Reef knot should be put on the splint or on the uninjured side to avoid discomfort.

BEGINNING

- Scouting's/Guidings history commences with a British Army Officer, Robert Stephenson Smyth Baden-Powell
- Baden-Powell (B.-P.) trained boys to follow a trail, tell directions, read danger signs, or find food and water during Making war and lastly won.
- In 1896, Baden–Powell began to write a small military handbook titled Aids to Scouting.
- At the end of July 1906, Baden-Powell sent Seton his "Aids to Scouting' and wrote his ideas on Scouting for Boys'.
- An experimental camp in Brown sea Island, in Poole Harbour, Dorset, England in August 1907 organised by Baden-Powell. 20 campers attended.
- 1909 at Crystal Place, London, Over 11,000 Scouts in uniform who attended the rally proved their willingness to play the game of Scouting. Girls also were present wearing uniforms like Boy Scouts. When he asked them Who are you? they replied, 'We are Girl Scouts!"

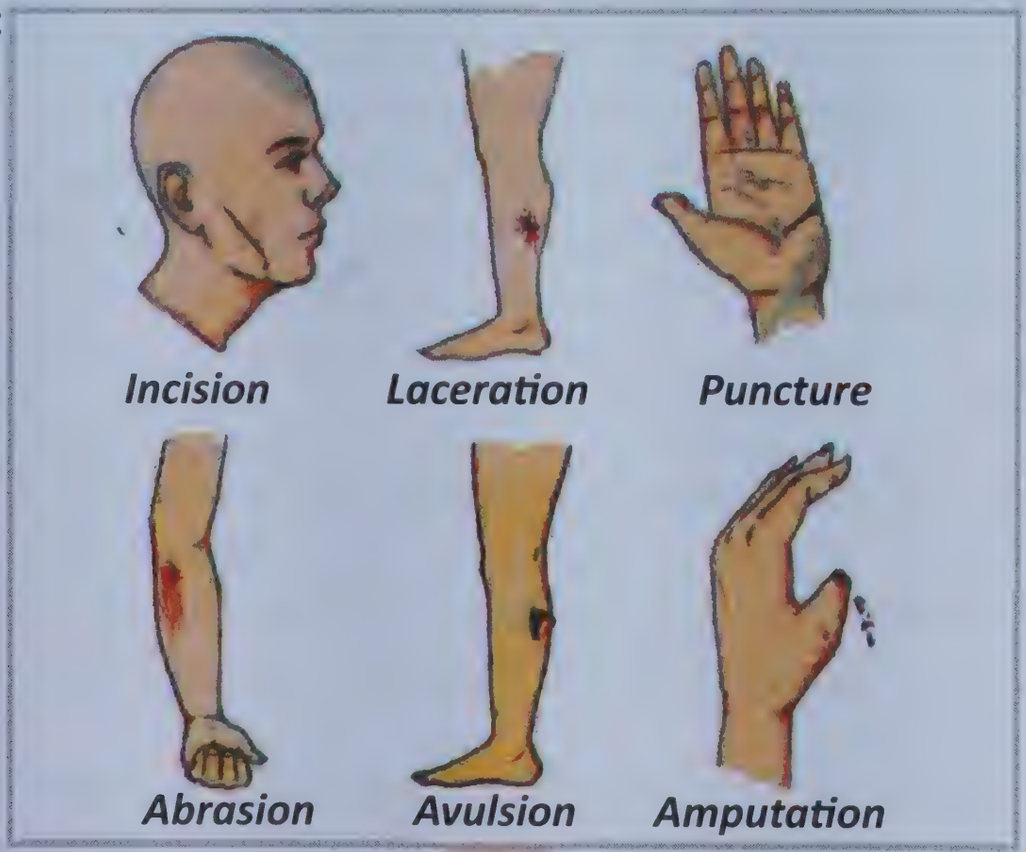

try to leave this world a little better
than you found it and, when your turn
comes to die, you can die
happy in feeling that at any rate you
have not wasted your time but have
done your best
Robert Baden Powell

BLOOD AND CIRCULATION RELATED INJURIES

Blood is the nectar of life; it circulates oxygen, nutrients, hormones etc. in the body and also carries carbon dioxide, toxins and waste products for elimination. A required volume of blood is necessary for healthy being and survival so the loss of blood by injury can cause shock and even death.

Wounds

A wound is an injury or discontinuation in the tissues (mainly skin) caused by physical means. The severity of wound ranges from mild to severe to potentially fatal. The wound causes bleeding and entry of microbes in the body which cause infection. The wounds can be classified as:



- **Incisions:** They are caused by sharp objects like knives, razors or glass pieces so the cuts are clean and the wounds bleed profusely. The flowing blood from thin opening prevents microbes from entering, so there is generally little risk of infection.
- **Lacerations:** They are caused by objects like blunt knives, machinery or animal bites so skin is torn and has uneven edges. This causes relatively lesser blood loss but the depth of wound and irregular edges facilitate entry for microbes.

- **Punctures:** They are caused by sharp pointed objects such as nails, needles or bullets with a small opening. They usually cause less bleeding and less infection but bullet wounds and other deep punctures can cause infection and internal bleeding.
- **Abrasions**: They are caused by rub of the skin against rough/ rigid surfaces e.g. rugs, stones or ropes resulting in scraping the layers of the skin. Sometimes they may be severe and contaminated scraping material can cause infection.
- **Avulsions:** They are severe as take place when skin is physically torn away from a body part. This causes heavy bleeding and infection by microbes. The skin tissue can be re-attached to the body part if collected with proper sanitary procedures.
- **Amputations:** They are caused by fatal force like bomb explosions, sword etc. in which a limb is removed from the body. Heavy bleeding causes patient to go into shock. In this bleeding may be stopped or slowed by applying tourniquet/ binder. Re-attachment of the limb is often successful if collected with proper sanitary procedures.

Bleeding

Bleeding is blood coming out of cut or torn blood vessels. Excessive bleeding may cause shock and even death. There are three types of blood vessels viz.1. **Arteries:** carry oxygenated blood from heart to body 2. **Veins:** carry de-oxygenated blood from body to heart and 3. **Capillaries:** branches of artery, carry blood to body part. Bleeding can be classified as:

- **External bleeding:** If bleeding is outside the body i.e. surface of the body is wounded.
- **Internal bleeding:** If bleeding is within the body e.g. abdomen.

Artery
Blood Fast flow/Bright Red

Vein
Blood Steady flow/Dark Red

Capillary
Blood Slow-Even flow/Red

External bleeding from deep/severe wounds

Make sure there is no danger, reassure the casualty and arrange for medical help. Wash hands or use sanitizer and wear gloves or clean plastic bags, if available. Take off jewelry, watch etc. around wound that may hinder blood supply in case of swelling.

1. Direct Pressure 2. Indirect Pressure 3. Elevation

- Rest the injured part to decrease bleeding.
- Elevate the injured part to decrease blood flow.
- Press directly on to the wound with clean cloth or bandage*
- If possible apply indirect pressure at pressure point to stop arterial bleeding.**
- Apply firm bandage to keep the pressure and if required continue pressing with hands.
- Apply binder in case of very severe bleeding e.g. Amputation***
- If person falls unconscious put him in recovery position and keep attended.
- Guard against SHOCK and arrange medical help.

* If some object is stuck in the wound put Ring Pad around the wound and then apply pressure and bandage.

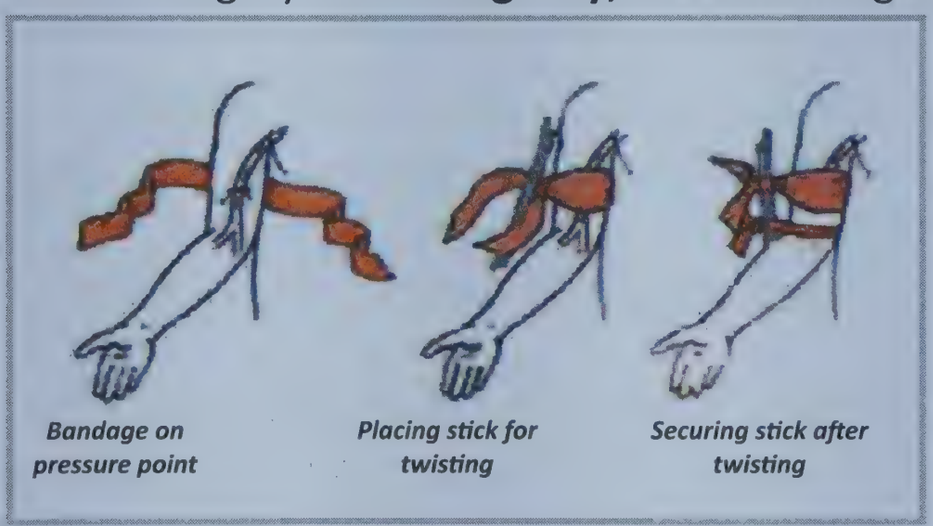
** Pressure point is the place where an artery can be pressed against an underlying bone to stop blood flow beyond that point as shown in picture **2** above i.e. brachial pressure point in arm.

*** In case of Amputation clean the detached part with clean water and wrap it in a piece of moist gauge/ towel. Then put it into a zip pouch and seal it. Now put this pouch into a bigger zip pouch or poly bag filled with ice and seal it. Send the casualty and the detached part to the hospital.

Applying Ring pad *Bandage on Ring Pad* *Preserving Amputed finger*

Binder or Tourniquet

A Binder or Tourniquet is bandage which is used as a constricting device to stop blood circulation beyond its point of application. It is used in extreme cases of severe bleeding where blood loss is high and can't be controlled otherwise. It is tied at a place where there is a **single underlying bone** and pressure is **applied at-least 5 cm. above** the wound. There are two types of tourniquets viz. **surgical;** frequently used in surgery and **emergency;** used in emergency situations.



Bandage on pressure point *Placing stick for twisting* *Securing stick after twisting*

Emergency Tourniquet

Surgical Tourniquet

Emergency binder can be made from a stick and a bandage/cloth at-least 4 cm. wide. A loop is made from the bandage that fits over the damaged limb and a stick is inserted through the loop and a knot is applied to fixed it. The loop is tightened by twisting the stick and stick is fixed at its place to maintain the pressure.

Always remember:

- It should be used in life threatening condition only as it may cause tissue/nerve damage.

- Once applied it must not be released unless done by medical expert. Normally binder don't cause any severe tissue damages till 2 hours.
- Mark a capital **"T"** with the time of binding on the forehead of the casualty, so that the binder may be released in time by the next caretaker.

External bleeding from minor wounds

In case of minor wounds or scratches wash the injured site with antiseptic lotion or clean water and apply clean bandage. Minor bleeding can be stopped using **RICE** method.

- **R**est: move the injured part minimally to reduce bleeding.
- **I**cing: put ice pack near the injury to reduce bleeding (if feasible)
- **C**ompression: apply direct pressure and put bandage.
- **E**levation: raise the injured part to reduce bleeding (in case of fracture first immobilize)

Internal bleeding

Internal bleeding can be due to injury or diseases in the body. This is usually critical situation and requires immediate and proper handling. The internal bleeding can be visible in various ways viz.

- **Blood in urine** indicates internal bleeding from urinary track or kidney.
- **Blood in stools** which is dark red/brown indicates internal bleeding from stomach or intestines.
- **Blood in sputum** which is frothy and bright red, indicates injury to lungs.
- **Blood from nose** ears or bloodshot eyes indicates brain hemorrhage. **

Signs and Symptoms

- Pain and discoloration at the site of injury.
- Appearance of blood in sputum, urine, stools, ears etc.
- Pale face with cold and clammy skin.
- Fast but feeble pulse.

- Fast and shallow breathing
- Thirst, dizziness and deterioration in level of response.

What to do

- Ask the casualty to lie down or be in comfortable position.
- Keep the casualty comfortably warm & call medical help.
- Put cold compress at the site of internal bleeding.
- Reassure the casualty and guard against SHOCK.
- Monitor breathing and pulse and if unconscious put the casualty in recovery position.

In case of **Brain hemorrhage (internal bleeding from brain)blood mixed with clear straw color liquid (cerebrospinal fluid) may come out of nose and ears. The casualty's eyes may become red due to blood coming down with severe headache. This is **alarming condition**, move the casualty to the minimum and keep him warm. Clear the blood if coming out of nose and ears and position the head so that blood does not pool in nose/ear. Immediately transfer to the hospital, while keeping a check on breathing and pulse. **Apply FAST test to diagnose Brain Stroke (details in relevant chapter)**

Recovery Position

If casualty is unresponsive but breathing then turn him into the recovery position. Also if the casualty has noisy breath or has just been revived by CPR then also put him in recovery position. This keeps airway open and keep vomit, blood or saliva from entering the windpipe.

How to put casualty in Recovery position

- Kneel down next to casualty on the floor.
- Place casualty's arm nearest to you at a right angle to his body, with palm facing upwards.
- Hold casualty's other arm and place the back of his hand against his cheek nearest you and hold it there.
- With your other hand, lift his far knee and pull it up until his sole is flat on floor. Now pull on his bent knee and roll him towards you.
- The top arm should be supporting the head and the bent leg should be on the floor to stop him from rolling over.
- Tilt the head back and chin forward to make sure that the airway stays open and clear.
- Keep checking the breathing and pulse until medical help arrives. If required start **CPR.**

Bleeding from Nose

It can be due to direct blow, excessive heat, low atmospheric pressure (at high altitudes), medical complications or brain hemorrhage. If bleeding does not stop within 5 minutes seek medical help.

Pinch the Middle Soft Part of the Nose

What to do

- Make the casualty sit in shaded place with head tilted forward.
- Ensure fresh air and loosen cloths around neck and chest.
- Ask casualty to breathe through mouth and not to blow the nose.
- Apply cold pads (wet cloth) on nose and forehead.
- Pinch the middle soft part of the nose firmly but never plug nose.

- In case if it is due to high altitude then try to bring the casualty to lower altitude.
- In case if it is due to Brain hemorrhage then do as advised in relevant section.

Road Accidents

The roads are always prone to accidents as they cater variety of vehicles with varied speed and drivers with different levels of concentration and driving skills. The careless pedestrians, stray animals and sometimes bad roads are also responsible for road accidents. In road accident the impact by speeding vehicle causes a variety of injuries ranging from minor to fatal, which includes but not limited to:

- Fractures including complex fractures of spine, pelvis and head.
- Wounds of all types including amputation.
- Asphyxia or respiratory failure.
- Cardiac failure/ arrest
- Burns of all types.
- Shock

What to do

- Approach the site calmly and look out for any danger like moving vehicles or burning car.
- Shift the casualty to a safer place and check the response.
- Call for help and arrange medical help.
- Diagnose the casualty and give first aid according to the injury.
- Reassure the casualty and Guard against Shock.
- Note the details of other vehicle involved in accident, if any.
- Keep a watch on vital i.e. response level, breathing and pulse and act accordingly.

Shock

It is the condition when circulatory system is seriously disturbed or fails and as a result heart and brain are deprived of oxygen and so vital functions of the body are hindered. Shock is an uninvited guest i.e. it can come with any injury or trauma. Some of the most common causes of shock are:

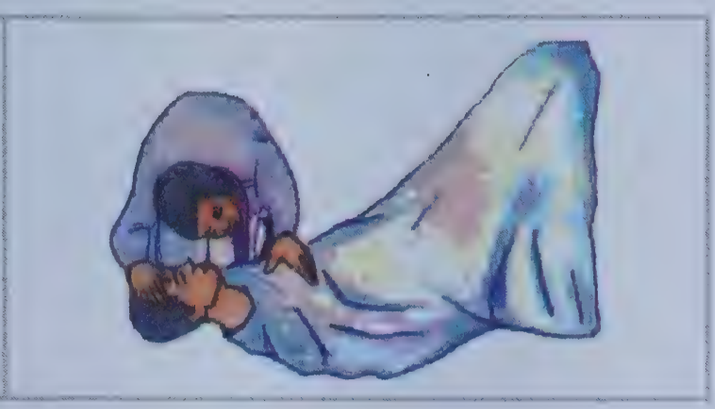
- Severe blood loss due to excessive bleeding.
- Heart's inability to pump enough blood e.g. heart disease, heart attack or heart failure.
- Low blood sugar level (diabetes)
- Low body temperature (hypothermia)
- Severe allergic reaction (anaphylactic shock)
- Neurological injury hindering functioning of body organs.
- Respiratory track injury causing hindered oxygen supply.
- Psychological reasons like any sudden news etc.

Signs and Symptoms

- Pale, cold and clammy skin
- Fast and feeble pulse
- Rapid and shallow breathing
- Weakness, anxiety, dizziness, thirst, vomiting and fainting

What to do

Raise the legs



Keep warm and attended

- Reassure the casualty to bring him out of trauma and arrange medical help.
- Remove the possible cause of shock and treat for the injury/illness.
- Loosen the tight cloths and keep the casualty warm
- Raise the legs at least 18 inches and support the legs.
- Lower the head slightly and tilt it to one side to let sputum, vomit etc. flow out, if there.
- Don't give anything to drink or eat.
- Monitor breathing and pulse and if unconscious put the casualty in recovery position.

Electric Shock

When a casualty comes in contact with the electricity, it is conducted through the body giving an electric shock. In an electric shock the casualty may receive significant burns, respiratory problem or the electric shock may interfere with the heart's electrical system, causing cardiac arrest.

What to do

A very cautious approach is must, be careful not to touch the casualty before the electrical source is disconnected and also look for the presence of water or conducting materials which may be in contact.

Disconnecting person from electric source

- **Domestic voltage:** First of all disconnect the casualty from the electrical source by:

1. Unplugging the appliance or turning off the main board/ trip switch or
2. Removing the casualty from the electrical source by pushing or pulling with non-conducting materials e.g. wooden stick or board, rope, blanket etc.

- Call for emergency medical help.
- Check the response of the casualty.

- If conscious, treat the casualty for the injuries e.g. burn etc.
- If unconscious but breathing, put the casualty in recovery position.
- If unconscious and not breathing, give mouth to mouth resuscitation.
- If no pulse start CPR immediately.
- Re-assure the casualty and guard against Shock.
- While medical help arrives, keep a watch on the casualty.

❖ **High voltage:** Electricity can earth itself by arching across air gap to an object or person (it can jump!). So there is a danger zone of up to 20 meters around the source depending on the voltage and the level of humidity in the atmosphere. **You can do nothing for a casualty within the zone of danger! So in high voltage zone-Just protect yourself and others.**

- Call the electricity department, number is usually mentioned on the power installations.
- Call the medical services.

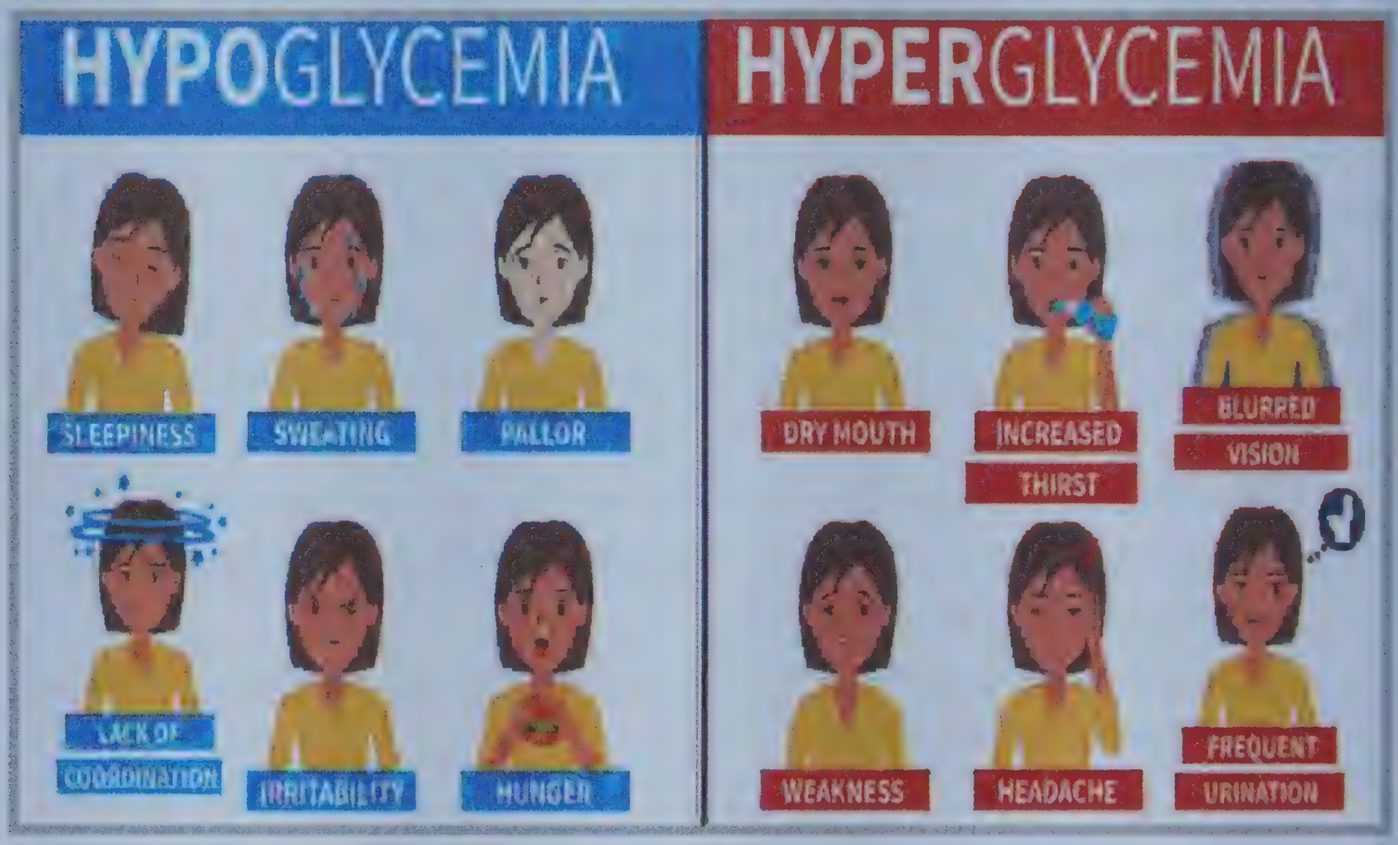
In case power lines are fallen across a car, the tyres insulate people inside car. So tell them to stay inside the car until source of electric current is removed.

Diabetic Emergency

Diabetes is a lifelong medical condition where the body either can not produce enough insulin or can't use insulin to process blood sugar. Insulin is a hormone produced by the pancreas, which regulates the blood sugar level in the body. Diabetes causes lots of complication and a regular medication and life style adjustments need to be followed. There are two types of diabetes:

- **Type 1 or insulin-dependent diabetes** where insulin producing cells in the pancreas are damaged or absent so body either can't produce or insufficiently produce insulin.
- **Type 2 or non-insulin-dependent diabetes** where body can't use insulin properly.

Sometimes diabetic people may have a diabetic emergency, where their blood sugar becomes either too high or too low. Both conditions are potentially serious and may need treatment in hospital.



High blood sugar (Hyperglycemia)

It occurs due to high glucose level, which is often caused due to insufficient insulin produced by the pancreas or due to infections, diseases, overeating, stress and reduced physical activity. If not treated, the person can gradually become unresponsive and go into a **diabetic coma.** A diabetic takes insulin dose to be able to break down carbohydrates. Thus, skipping insulin doses may cause hyperglycaemia.

Signs and Symptoms

- Warm and Dry skin
- Rapid pulse and breathing
- Fruity sweet smell in breath
- Thirst and frequent urination
- Drowsiness leading to unresponsiveness if not treated

What to do

- Give water to drink to prevent dehydration and flush out sugar.
- Keep checking the breathing, pulse and level of response.

- If casualty loses responsiveness, treat as for unconsciousness.
- If condition doesn't improve quickly, call for medical help.

ow blood sugar (Hypoglycemia)

t occurs due to too much insulin in the blood. This often happens if a iabetic takes insulin overdose or skips a meal, over-exercise, illness, lehydration, vomiting, infection or high fever.

igns and Symptoms

- Weakness, faintness and trembling.
- Sweating with cold and clammy skin
- Confusion, deteriorating response level
- Rapid pulse and Hunger

Vhat to do

- Help casualty to sit down; give something sugary like fruit juice, sweets etc. and stay with casualty until he feels completely better.
- Keep checking responsiveness, breathing and pulse.
- If condition does not improve quickly call for medical help.

UNSURE whether blood sugar is high or low then:

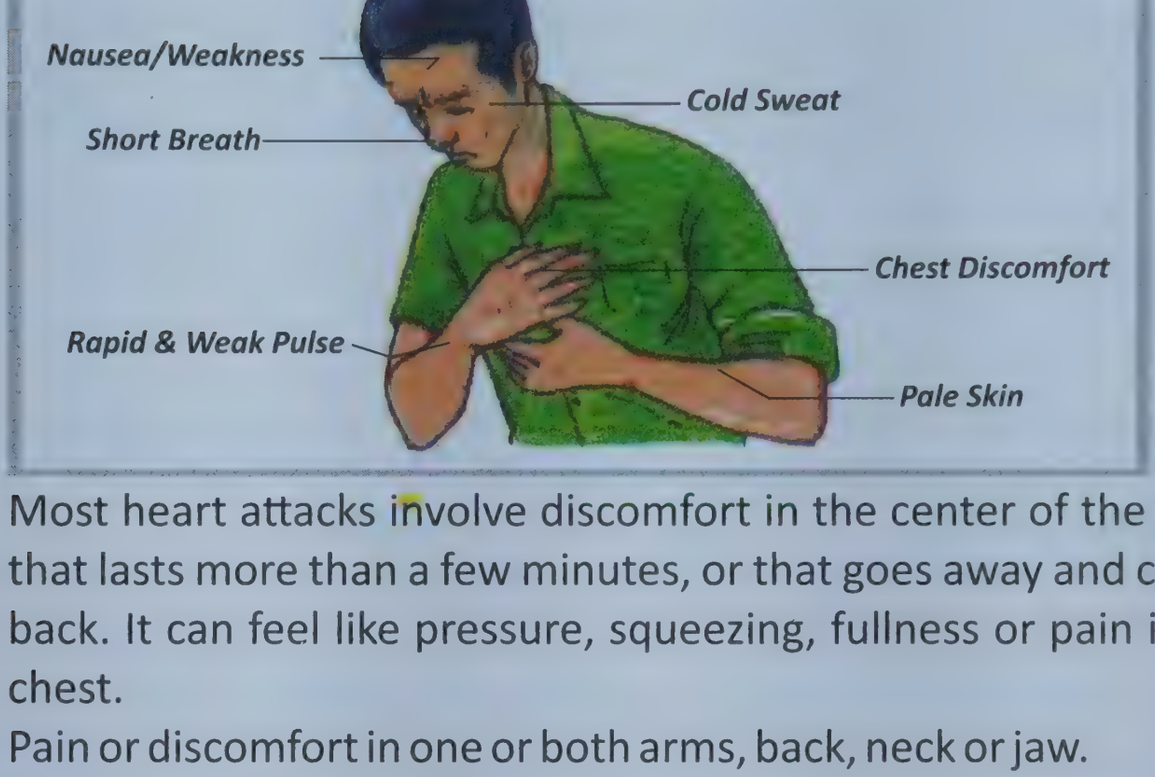
- Give something sugary anyway, as this will quickly relieve low blood sugar and is unlikely to do harm in cases of high blood sugar.
- Keep checking the level of response, breathing and pulse.

eart Attack

heart attack occurs when the blood flow that brings oxygen to the eart muscle is severely reduced or cut off completely. The blockage in ow is most often due to buildup of plaque (fat, cholesterol etc.) in the oronary arteries that feed the heart. When the heart muscle is starved r oxygen and nutrients, it is called **Ischemia**. When damage or death the heart muscle occurs as a result of ischemia, it is called a heart tack or **Myocardial Infraction (MI).**

gn and Symptoms

though some heart attacks are sudden and intense, most start slowly th mild pain or discomfort.



- Most heart attacks involve discomfort in the center of the chest that lasts more than a few minutes, or that goes away and comes back. It can feel like pressure, squeezing, fullness or pain in the chest.
- Pain or discomfort in one or both arms, back, neck or jaw.
- Shortness of breath with or without chest discomfort.
- Pale skin, cold sweat, rapid and weak pulse, nausea, lightheadedness and weakness.

What to do

- If you think someone is having a heart attack:
- Call for medical help immediately.
- Try to keep calm, reassure the casualty and loosen tight clothing.
- Help the casualty to sit leaning against a wall with knees bent and head and shoulders supported to ease the pressure on heart and to stop the casualty from hurting himself in case of collapse.
- If person takes any medicine for known heart condition e.g. nitroglycerin, give it, else give aspirin to chew.
- If the casualty has no breathing/ pulse then begin CPR.

Comfortable Position in Heart Problem

CPR

O NOT

- Do NOT leave the person alone.
- Do NOT wait to see if the symptoms go away.
- Do NOT give the person anything by mouth except a prescribed heart medicine e.g. nitroglycerin, or aspirin to chew.

ARDIAC ARREST

ardiac arrest is the sudden and complete stoppage of the heart nctioning in a person with or without heart disease. Cardiac arrest appens when the electrical impulses in the heart stop and so the heart nnot beat any longer causing sudden collapses and unconscious ithout breath and pulse.

CALL FOR AMBULANCE ::: GIVE HANDS ONLY CPR and ::: USE AED

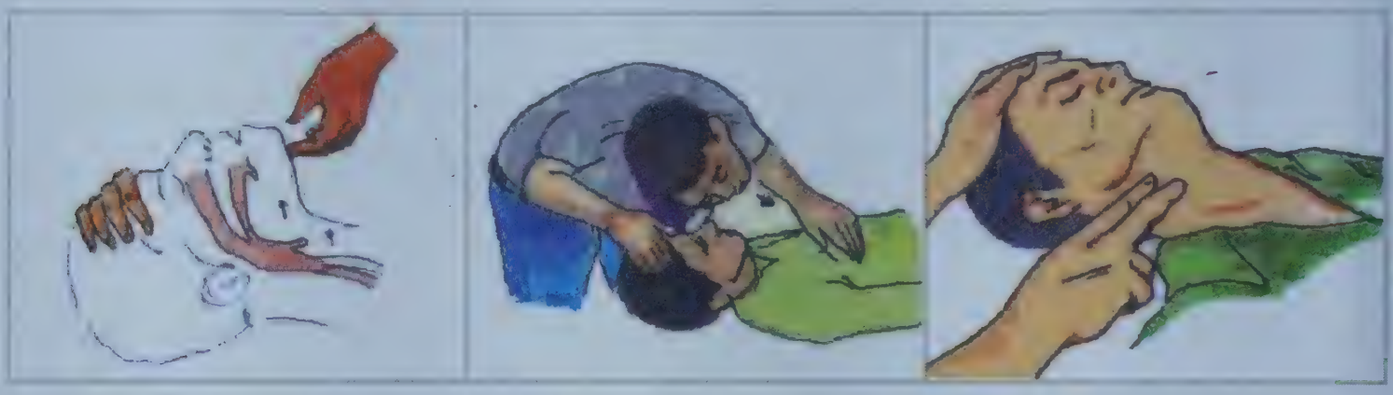
PR (Cardio Pulmonary Resuscitation)

a person is unresponsive, not breathing and without pulse then CPR is ven. It is a continuous rhythmic method of giving a combination of 30 est compressions and 2 rescue breaths to keep his heart and rculation going, to try to save his life. **CPR involves a series of actions illustrated below:**

pen the airway: If casualty is **unconscious,** open the airway by placing ne hand on the casualty's forehead and two fingers of the other hand nder the chin. Now gently tilt his head back and lift the chin. This is lled **Head tilt-Chin up method.** This way the airway becomes straight felicitate breathing.

heck the response: Now maintaining head tilt-chin up position, use **ook, Listen and Feel method** i.e. kneel besides the casualty, put one and over the casualty's chest, look onto chest and bring your cheek ear the nose of the casualty. This way look at the chest movement for spiration, listen to the breathing sound coming out of casualty's nose nd feel the warm air coming out of nose. Check the pulse by **Carotid rtery** (on either side of windpipe besides Adam's apple). This whole rocedure should be done within 10 seconds. **If breathing,** put the

casualty in recovery positions. **If not breathing,** give rescue breaths and **If no pulse go for CPR.**



Head tilt-Chin up Method *Look-Listen and Feel Method* *Checking Pulse by Carotid Artery*

Call for help: Call for medical help and take help from others. Use speaker phone while giving CPR.

Chest compressions: Put the casualty on flat and hard surface. Kneel down beside the exposed chest of the casualty and do as following.

Location of hand for CPR/Chest Compression

- Place the heel of one hand two fingers above the tip of the casualty's breastbone.
- Place the heel of other hand on top of the first hand and interlock the fingers, keep the fingers off the ribs.
- Keep the arms straight, lean over the casualty and press down vertically on the breastbone by 5-6cm for adults and 3-4 cm for children. Generally it is 1/3 of the chest depth.
- Release the pressure without removing the hands from the chest. Allow the chest to come back up fully – this completes one compression.
- Press 30 times, at a rate of about 100-120 times per minutes.

escue breath/ Ventilation: After 30 compressions, immediately vitch to two rescue breaths as following.

Maintain head tilt-chin up and look onto chest

- Ensure the casualty's airway is open by head tilt-chin up method.
- Pinch casualty's nose firmly closed.
- Take a deep breath and seal your lips around casualty's mouth (if barrier e.g. cloth or tube mask is available place it on casualty mouth to avoid infection).
- Blow sharply for 1 second into the mouth and look for chest rise.
- Remove your mouth and allow the chest to fall.
- Repeat once more after 4 seconds of the first blow.

Carry on giving this cycle of 30 chest compressions followed by 2 rescue breaths.

If two persons are available then one should give compression and other should give ventilation in rhythm. They can switch after 5 cycles or whenever required.

One should keep giving CPR till the casualty has revived or someone else who is responsible has taken over or medical help has arrived.

he casualty starts breathing normally again, stop CPR and put in the overy position and keep a watch till medical help arrives.

R for Infant and Child

infant use only two fingertips to press 30 times vertically on the astbone by one-third of the chest's depth. Now make a seal around mouth and nose of the baby and give 2 ventilation. For babies never

give full blow to lungs and hard thrust to heart. **For child** use one hand for compressions.

Two fingers compression for infant

One hand used for child

HANDS ONLY CPR: It is given when mouth to mouth respiration is not possible due to certain reasons like burnt mouth or hygiene. In sudden cardiac arrest hands only CPR is given. In this method only chest compressions at the rate of 100-120 compressions per minute are given continuously.

AED (Automated External Defibrillator)

An **automated external defibrillator (AED)** is a portable electronic device that automatically diagnoses the life-threatening irregular heart rhythms (cardiac arrhythmias) and delivers a therapeutic electric shock to the heart as treatment. The application of electricity stops the arrhythmia thus allowing the heart to re-establish rhythm. It is also used in Sudden Cardiac Arrest (SCA) to restart the heart beat by giving electric shock. AED gives simple audio and visual commands so it can be easily used by any layperson.

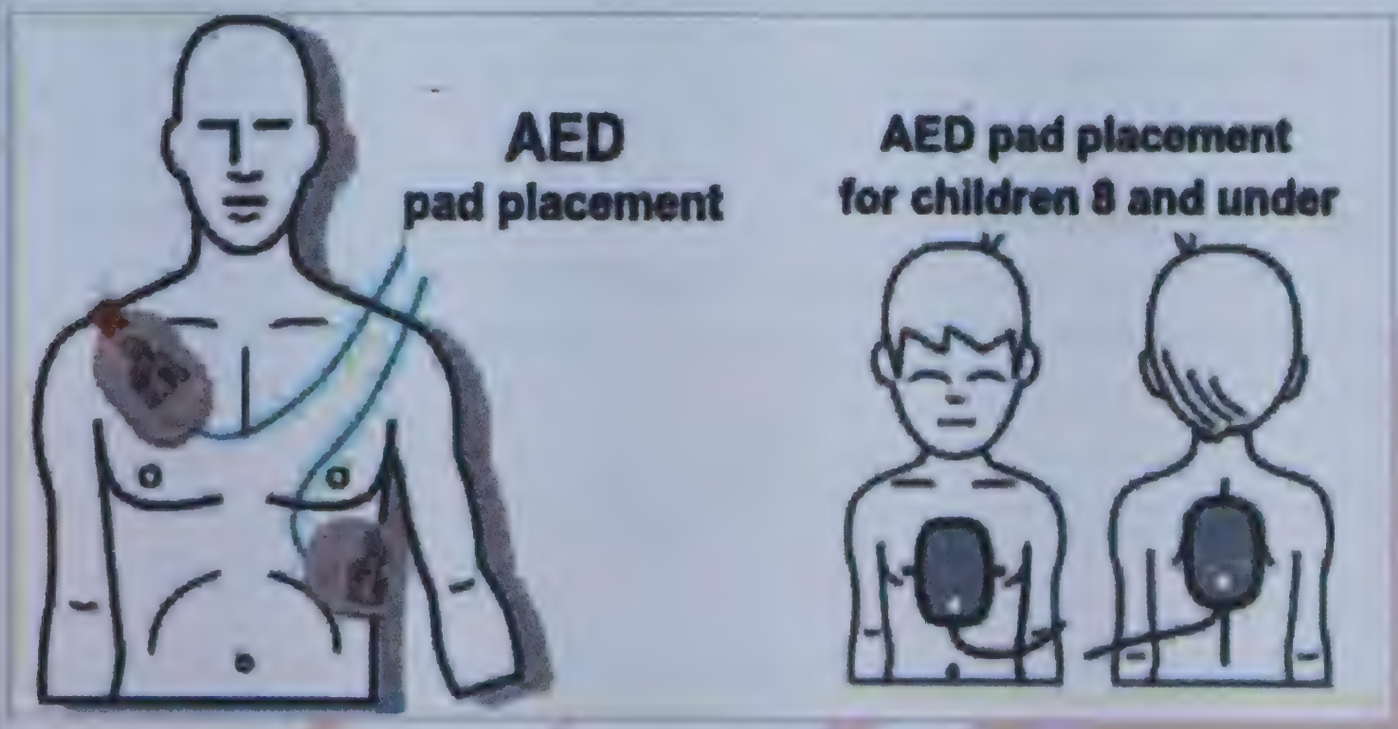
AED showing location of Pads on the cover

How to use AED

If there are two trained rescuers, one should keep doing CPR while the other person can prepare the AED for use. Do not stop CPR while the AED is being readied and pads are being placed. The AED will prompt to stop CPR when it is ready to analyze the heart rhythm and deliver shock.

- **Switch on the AED:** Place the AED near the casualty's head and switch it on, usually it starts automatically on opening the lid.
- **Place the AED pads:** Expose and wipe dry the casualty's chest. Place one pad on the chest just below the right collar bone and other pad on the lower left side of the rib cage. Now connect the pads to the AED, if not connected. For **children** up to 8 years place the pads as shown in picture below.
- **Shock delivery:** When AED prompts to deliver a shock, make sure no one touches the casualty. Now the rescuer can push the shock button. Once shock is delivered CPR must be continued till AED again prompts for a shock. Keep the AED connected while giving CPR so that it keeps on analyzing heart rhythm.

Child/ Infant casualty: Use an AED with pediatric pads or equipment. If these are not available, use the AED with adult pads and settings.



RESPIRATORY SYSTEM RELATED INJURIES

We breathe to provide oxygen to our body which is needed to burn the fuel i.e. sugars and fatty acids in our cells to produce energy. When we breathe oxygen reaches into the lungs from where it is transported by **RBC** (red blood cells) to the entire body. If there is any hindrance in the supply of oxygen to the body even for a few moments, the consequences are very serious and even fatal.

Asphyxia

Asphyxia is lack of oxygen or excess of carbon dioxide in the body. It is usually caused by an inability to acquire sufficient oxygen through breathing for an extended period of time. Nerve cells in the brain can survive only up to four minutes without oxygen, after that these cells die and leads to unconsciousness, coma and death. There are many circumstances that can cause asphyxia, such as

- Blockage of airway by foreign materials i.e. choking
- Constriction or obstruction of airways by diseases e.g. asthma, laryngospasm, pneumonia etc.
- Hanging or Smothering
- Toxic gases or high pollution in the air
- Low oxygen atmosphere
- Drowning
- Poisons

Signs and Symptoms

- Difficulty in breathing, Noisy breathing
- Bluish face, Swollen veins on the head and neck
- Rapid pulse
- Slowly losing consciousness
- Convulsions

What to do

There are various reasons of asphyxia so first aid will vary according to the situation. In any case immediate approach to subside the cause and restoration of oxygen to the casualty is needed.

- Subside the cause of asphyxia immediately; ensure fresh air and arrange medical help.
- Loosen tight clothing, especially around the neck and chest.
- Check for vitals i.e. breathing and circulation.
- If casualty is unconscious and or having difficulty in breathing put him in recovery position.
- If casualty has pulse but not breathing, give rescue breaths.
- If casualty is unconscious with no breath and pulse, perform CPR.
- Don't leave victims of asphyxia alone, even if consciousness is regained.

Some scenarios involving Asphyxia

Gas poisoning: Ensure fresh air and give recovery position/ artificial respiration/ CPR as required.

Strangulation: Remove the strangling object immediately and give recovery position/ artificial respiration/ CPR as required.

Asthma attack: Assist the victim to sit upright and assist to medication e.g. puffs.

Choking

Severe difficulty in breathing because of obstruction in airway is called choking. It can be caused by accidental stuck of any object like marble, coin, big piece of eatable in the airway etc. Choking can be fatal if the obstruction is not removed immediately.

Signs and Symptoms

- Difficulty in breathing and in making any sound.
- Casualty puts hands around throat and tries to cough out something.
- Lips turn blue and veins of face and neck protrude out.
- Casualty may become unconscious.

What to do

Ask the casualty 'Are you choking' to check he is not suffering from something else. If he can't cough or make any noise, it's serious matter. Try to clear the choking with the following three steps.

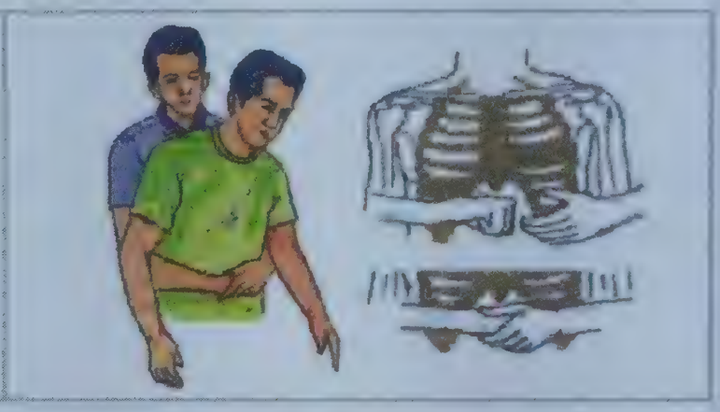
Step 1: Cough

- Encourage him to cough to dislodge the obstruction.

Step 2: Back Thrusts

- If coughing doesn't work, lean the casualty forward by supporting him from back.
- Use the heel of your palm to give up to five sharp back blows between his shoulder blades.
- Check casualty mouth for dislodged object, if there, take it out.

Back Thrusts



Abdominal Thrusts

Step 3: Abdominal thrusts or Heimlich maneuver

- If back blows don't work, stand behind the casualty and lean him forward.
- Put your fist with thumb inward between his tummy button and the lower tip of chest bone.
- Pull sharply 5 times inwards and upwards, like letter 'J' with the help of other hand.

If still choked, call for medical help and **continue steps 2 and 3 alternately** until choking is removed or help arrives or person becomes unresponsive. **If unresponsive and stops breathing, start CPR**

Drowning

Drowning is respiratory impairment as a result of being in or under water/any liquid. It can cause death by suffocation when water or other liquid fills the airway and lungs.

What to do

- Call the nearest lifeguard or ask someone to call medical help and rescuer, and do as follows.

- Take the person out of the water by:

1. If you are trained and if it is possible, try to rescue by swimming to the casualty.
2. If not trained throw buoy ring or life-line after shouting at and telling the drowning person that you are going to throw a life-line.
3. See if you can do anything else e.g. hanging ropes under a bridge, using plank or long stick or making human chain in shallow waters to reach out to the drowning person.

- Rescue breathing can be given in water also, if rescuer is trained.
- Once the casualty is taken out of the water check the response.
- If conscious, put the casualty in recovery position.
- If not breathing immediately give five rescue breaths followed by 30 chest compressions.
- **In drowning case the prime reason is respiratory impairment so first give 5 rescue breaths and then start giving CPR** and continue till casualty starts breathing or medical help arrives.
- If casualty starts breathing, put him in recovery position and keep warm by putting blanket.

Throwing a Life-Line

Life line is a rope with a buoy loop/tube/ ring or bag attached to its end. It is thrown to the drowning person so that he can catch hold of it or put it around his body. The rescuer then pulls the other end of the rope to take the casualty out to the water. It can be improvised with any rope by making a loop (bowline knot) at its end. There are certain tips to be followed for throwing a life line.

Life-Line

Throwing a Life-Line

- Always tie one end of the rope to your passive hand or hold it under your feet or fix it to something, so that while throwing the life line one end is secured with you.
- Make sure that the life line is strong, heavy and long enough to reach the drowning person.
- Shout at the drowning person before throwing the life line, so that he can catch hold of it.
- Make equal loops of rope and keep 1/3 loops in active hand and 2/3 in passive hand.
- Take one step out and throw the rope by underhand movement of active hand and release all of the rope.
- It is important that the attached ring/ tube lands very near to the drowning person and it needs practice.
- When drowning person has catch hold the rope, pull the casualty out of the water.

Fainting

Fainting or Syncope is a temporary loss of consciousness caused by a temporary loss of blood supply to the brain, but it can be a sign of a more serious condition. People often faint as a reaction to pain, hunger, emotional stress or exhaustion by working or standing for long.

Signs and Symptoms

- Sweating, Pale and cold skin, Pulse slow, Nausea, Dizziness and Weakness
- Blurred vision and Tingling sensations in the body.
- Casualty suddenly loses consciousness and falls to the ground.

If you feel fainted

- Sit down and place your head between your knees.
- Have some fluids and to reduce the chance of fainting again, take rest for a while before getting up.

Positions in Fainting

If someone else faints

- Position the person on his back in shady and airy place.
- Raise the person's legs at least 18 inches and tilt the head down by putting pillow.
- Loosen belts, collars or any constrictive clothing and keep him comfortably warm.
- Treat for injuries, if any.
- If the person is awake give fluids like juice to drink.
- If the person is unconscious put him in recovery position.
- If the person remains consciousness for more than a minute, call medical help.
- If the person isn't breathing, begin CPR and call for medical help.
- To reduce the chance of fainting again, don't let the person get up quickly.

Acute Mountain Sickness (AMS)

Acute mountain sickness **(AMS)** is the effect on the body due to high altitude environment. At high altitude there is physical distress due to difficulty in adjusting to lower oxygen pressure. Most Mild cases are resolved in a day or two but severe cases e.g. HAPE and HACE may be fatal.

Signs and Symptoms

- Headache, Fatigue, Nausea, Vomiting
- Weakness and Sleep problem
- Swelling of arms and legs
- Loss of appetite

What to do

- For mild acute mountain sickness, the person may stay at current altitude to see if the body adjusts. If symptoms don't go away in 24 to 48 hours or if they get worse, the person should go down to a lower altitude and seek immediate medical care.
- Even if symptoms are mild, don't move to higher altitude until symptoms are totally gone.
- For severe symptoms, the person should immediately be taken down 1500 to 2000 feet with minimum exertion. Keep going down until symptoms go away.
- Keep the casualty warm and give rest.
- Give plenty of liquids
- Give oxygen, if available.
- Avoid alcohol and sleeping pills, can give ibuprofen for headache.
- Acclimatization is the key i.e. let the body adjust to the conditions of high altitude.

The most fatal acute mountain sickness are **High Altitude Pulmonary Edema (HAPE) and High Altitude Cerebral Edema (HACE).**

High Altitude Pulmonary Edema (HAPE)

It is a fatal medical condition in which excess fluid is filled in the alveoli of the lungs because of the physiological effects of travelling to a high altitude without proper acclimatization. This condition generally appears in patients who have acute mountain sickness. It is an emergency requiring immediate supplemental oxygen & medication.

Signs and Symptoms

- Initially shortness of breath after exertion, which progresses to shortness of breath even at rest.
- Later, trouble in breathing and feeling of suffocating (dyspnoea)
- Cough which later comes with frothy sputum that may be tinged with blood
- Headache, which may be the first symptom, Fever and Fatigue
- Rapid and irregular heartbeat.
- Chest discomfort and profuse sweating.

What to do

- Give oxygen, if available and arrange medical help immediately.
- Immediately bring the casualty to lower altitude.
- Keep the casualty warm and give rest.
- Give plenty of liquids.
- Give ibuprofen for headache.
- No alcohol or sleeping medications.
- Give artificial respiration if required.

High Altitude Cerebral Edema (HACE)

It is a medical condition in which the brain swells with fluid because of the physiological effects of travelling to a high altitude without proper acclimatization. This condition generally appears in patients who have acute mountain sickness. It is a medical emergency requiring immediate care i.e. supplemental oxygen and medication.

Signs and Symptoms

- Severe headache develops followed by Confusion, Nausea and Lethargy
- An altered mental state, Dis-orientationand later loss of consciousness
- Sufferers generally attempt to cease physical activities, regardless of their necessity.
- Loss of coordination of muscles e.g. in- ability to sit up.
- Fever, Rapid pulse and Blurred vision

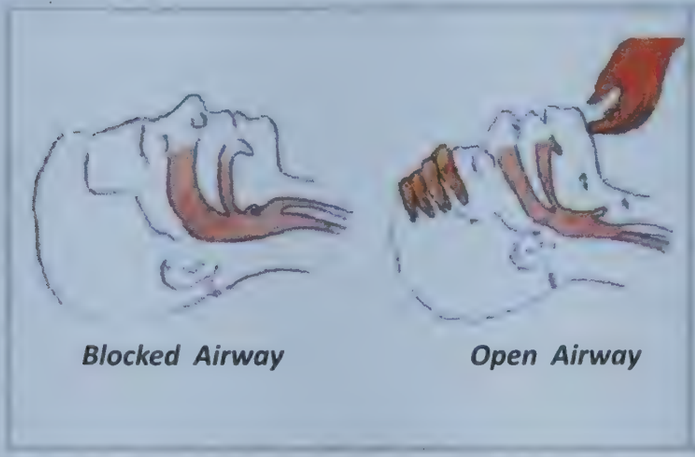
What to do

- Give oxygen, if available and immediately arrange medical help.
- Immediately bring the casualty to lower altitude.
- Keep the casualty warm and give rest.
- Give ibuprofen for headache.
- No alcohol or sleeping medications.
- Give artificial respiration if required.

Mouth to Mouth Resuscitation

It is a method of giving artificial respiration in which a person rhythmically blows air into the casualty lungs, by either placing his

mouth over the patient mouth or through a tube. It is one of the most effective and widely used methods.



Head tilt- Chin Up to Open the Airway

Mouth to Mouth Resuscitation

How to give a rescue breath

- Look for the safety, is the surroundings safe.
- Check the response of casualty.
- Check the airway and breathing and loosen cloth around chest and neck.
- If no breathing call for medical help.
- Ensure that casualty's airway is open by **Head tilt- Chin Up position.**
- Pinch his nose firmly closed.
- Take a deep breath and seal your lips around his mouth (if tube or barrier e.g. cloth is available place it on casualty mouth to avoid infection).
- Blow sharply for one second into the casualty mouth and look for chest rise.
- Remove your mouth and allow the chest to fall.
- If chest does not rise then check the airway for any obstruction and clear it.
- Repeat blow after 4 seconds and continue to give blows@12-14 per minute.
- Keep doing until medical help arrives or someone else takes charge.
- Keep the casualty attended, warm and put him in recovery position after he starts breathing.

NERVOUS SYSTEM RELATED INJURIES

Nervous system is the signalling and communication system of the body and any hindrance in the system through injury to brain, spinal cord or nerves can cause serious damages including paralysis or even death. Any injury or disease involving nervous system requires immediate action to stop further complications.

Unconsciousness

It is a condition in which person do not respond to commands or stimuli because of interruption in the normal functioning of the brain. It can be due to head injury, lack of blood supply to brain, lack of oxygen in blood, abnormal sugar levels, poison, epilepsy etc.

What to do

- Check the response by AVPU scale, breathing and pulse.
- If breath and pulse present, check and treat for injury and put casualty in Recovery position.
- If breath and pulse not present start CPR
- Never give anything to drink or eat and keep him warm.
- Keep a watch on him and arrange for medical help.

Head Injuries

Head injuries are very serious and require proper care because they may cause impaired consciousness and even death. They may be associated with brain damage, blood vessels damage, skull fractures or tissue compression. The types of head injuries are:

Concussion

It is a brief unconsciousness or impaired consciousness due to shake up of the brain inside the skull because of a fall or blow on the head. The casualty experiences dizziness, headache, nausea, blurred vision and sometimes brief loss of memories of the events occurred just before the incidence. The person becomes normal after a few minutes.

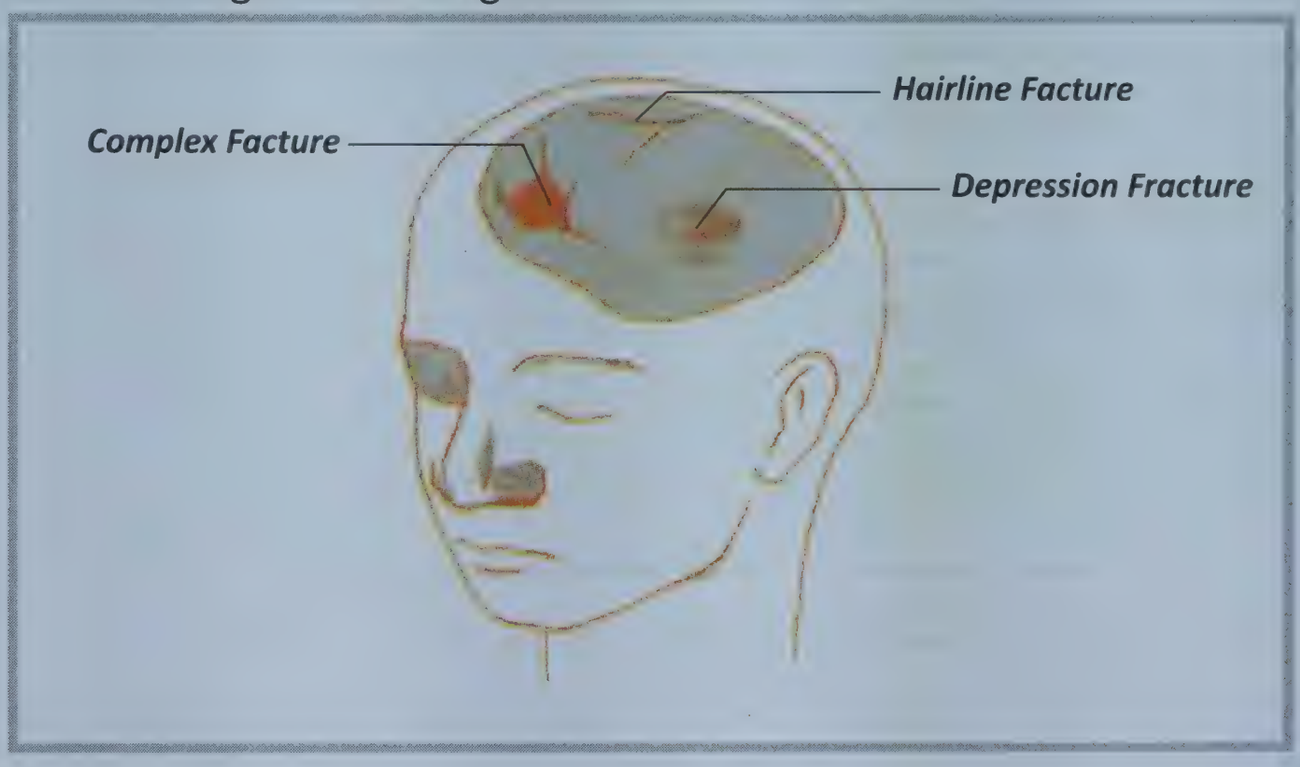
Cerebral Compression

The pressure exerted on the brain by swelling or bleeding inside the

skull is cerebral compression. This may be fatal situation and the casualty may become unconsciousness very soon. The casualty experiences intense headache, dizziness and blurred vision. The breathing and pulse get slow and pupil become unequal in size. The person can be paralyzed on one side of the face/ body.

Skull fracture

It is very dangerous because of risks of brain damage and bleeding. It can be observed by a depression or soft area or irregularity on the scalp. There can be swelling or bruising or clear watery Cerebrospinal fluid with blood might be coming out of ears or nose.



Signs and Symptoms

In heads injuries various sign and symptoms appear, some of these may develop immediately, while others may become apparent over a period of days or weeks.

- Blacking out, may be briefly
- Blurred or double vision, seeing stars/ lights in front of the eyes
- Headache, Nausea or Vomiting, Confusion
- Paralysis of the body or any part of the body.
- Slurred speech and Memory problems
- Uneven and large pupil size, Light and sound sensitivity
- Lack of motor coordination or difficulty balancing

What to do

- Don't disturb the casualty and move as little as possible.
- Stabilize the head and keep slightly raised.
- Apply Ice pack if swelling appears.
- Keep him comfortably warm.
- Keep a watch on vitals i.e. breath and pulse.
- Arrange medical help immediately

Epilepsy/ Fits/ Seizures

It is a neurological disorder which creates disturbance in the brain activities and causes sudden uncontrollable shaking and shivering of the body and sometimes unconsciousness. It can be caused by neurological disorder, brain injury, high fever, malaria, drug abuse etc. **Seizures/ fits** are the single misfiring of the group of neurons in the human brain. **Epilepsy** is two or more seizures recurring in the brain. Epilepsy is also called "seizure disorder."

Signs and Symptoms

- Pale/ Blue face, Fixed or rolling eyes
- Sudden uncontrollable body shaking.
- Foaming of mouth/ drooling and Biting own tongue.
- Irregular breathing and rapid pulse.
- Loss of bladder control
- Loss of consciousness

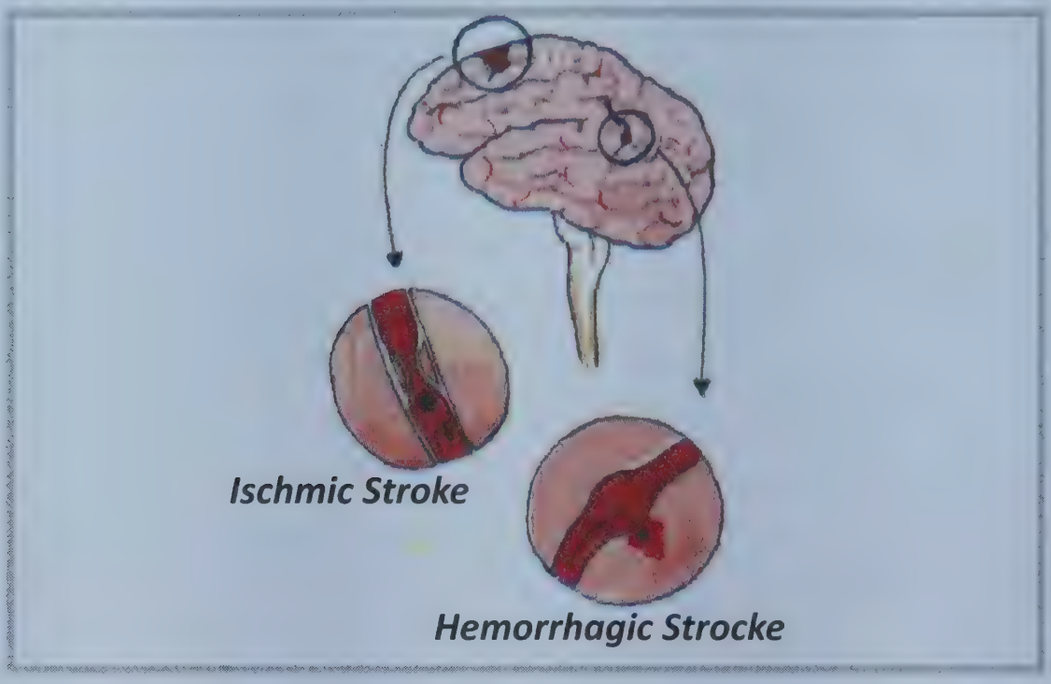
What to do

- Remove any objects around which may hurt the person or anyone around.
- Never restrain the person and don't put anything in mouth to prevent biting his tongue.
- Ensure fresh air and loosen cloths around neck and chest.
- When fits are over wipe face & put casualty in recovery position.
- Keep him warm and never give anything to eat or drink.
- Keep the person under observation and arrange for medical help.

Stroke

A stroke is a medical condition in which poor or interrupted blood flow

to the brain results in brain cell death. The way a stroke affects the brain depends on which part of the brain suffers damage, and to what degree. There are two main types of stroke: **ischemic,** due to lack of blood flow to the brain and **hemorrhagic,** due to bleeding in the brain.



Signs and Symptoms

Depending on the severity of the stroke, signs and symptoms may be mild or severe. The warning signs of a stroke are remembered by the acronym **FAST.**

- F **Face:** Face droop on one side or uneven smile.
- A **Arms:** Arms numb or inability to raise both arms equally.
- S **Speech:** Speech slurred.
- T **Time:** Time to call emergency, if answer to any one of the above is YES.

There are some other signs and symptoms of Stroke:

- Blurred vision, dim vision or loss of vision, especially in one eye
- Tingling, Weakness or Numbness on one side of the body
- Headache, Dizziness, Nausea
- Loss of bladder or bowel control
- Loss of balance or consciousness

What to do

Remember, even if symptoms are subtle or go away, take them seriously and immediately arrange medical help. Every moment counts because

it only takes minutes for brain cells to start dying and generate very serious consequences.

- Call emergency services and while medical help is awaited do as follows
- Lay the casualty on his back with head slightly raised and head turned to one side.
- Avoid shaking or moving the casualty.
- Cover the casualty to keep warm.
- Observe any changes carefully and keep a check on breath and pulse.
- Don't give anything to eat or drink

HER WORLD HER VOICE

The Bharat Scouts and Guides along with three large-scale charitable organisations working with young people around the world: Generation Unlimited, **UNICEF and WAGGGS**. With the support from UPS, we aim to make an impact in enhancing the Ranger section through three identified global priority areas, crystallised in the Generation Unlimited (Yuwaah!) strategy: -

Equity: ensuring Rangers from under represented communities can access support.

Engagement: ensuring the voices of young women in India are counted and heard, by enrolling over 1 lac U reporters in Guide wing.

Empowerment: Enhance the skills of young women through "My Rights and Me" seminar to make an impact in their communities.

MUSCULOSKELETAL SYSTEM RELATED INJURIES

We very often come across injuries to muscles and bones and they cause inability to move and loss of blood volume. These injuries need proper handling to avoid immediate and later complication.

Sprain

The ligaments are tough, elastic bands that connect bone to bone and hold joints in place. A sprain is an injury caused by overstretching or tearing of the ligament. It has many common sign and symptoms to fracture so in case of doubt always treat it as fracture and manage accordingly.

Signs and Symptoms

- Inability to move the joint or decreased range of motion.
- Pain around the joint.
- Swelling around the joint
- Bruising around the joint.

What to do

Sprain is always at joint so it is quite uncomfortable and painful. Never massage or twist the injured part as this will worsen the injury and increase the blood flow to the site, eventually increase the pain and swelling.

R ⊃ Rest the injured part

I ⊃ Icing of the injured part with ice pack or wet cloth to reduce pain and swelling.

C ⊃ Compress the injured part with bandage to reduce swelling and give support.

E ⊃ Elevate the injured part.

Ask the injured persons to seek medical help and give rest to the injured part avoiding unnecessary movement.

Strain

Strain is injury to the muscle due to over stretching or tearing of muscle fiber or its attached tendons. Strains have symptoms localized to the muscle groups or tendons that are injured.

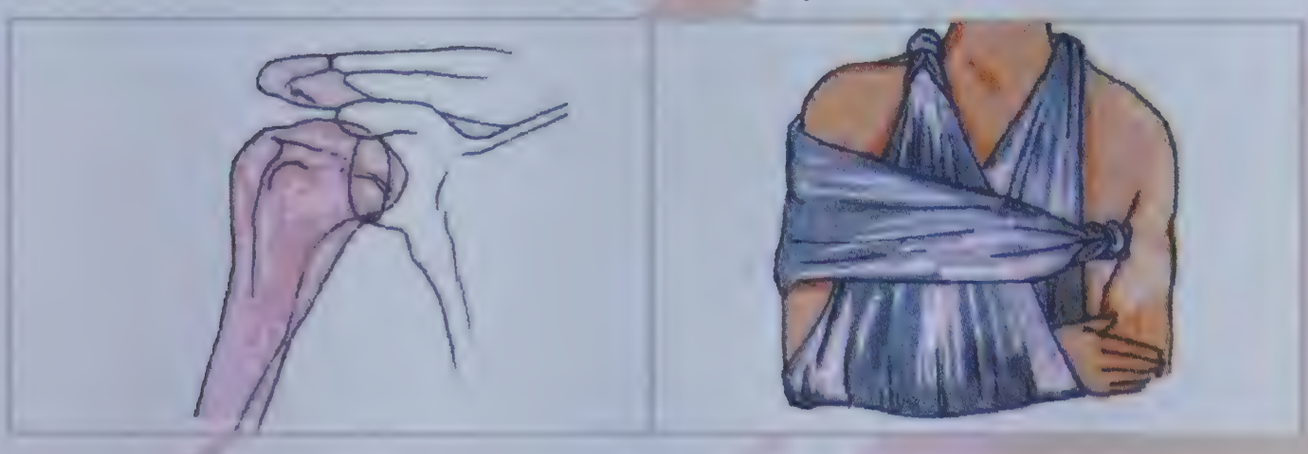
Signs and Symptoms

- Sudden sharp pain
- Swelling
- Muscle spasm/Muscle cramping/Muscle weakness
- Bruising may occur but may be delayed for several days.

The first aid for strain is also **RICE** i.e. Rest, Ice, Compress and Elevation.

Dislocation

It is displacement of a bone at a joint e.g. shoulder or knee due to direct impact, twist or violent contraction of the muscles. A dislocation is very painful and may cause break in the end of bone or tearing of the ligaments around the joint. If not sure, always treat it as broken bone.



Dislocated shoulder *Supporting dislocated shoulder*

Signs and Symptoms

- Pain at the site and movement becomes almost impossible.
- The joint looks deformed.
- Swelling and dis-coloration

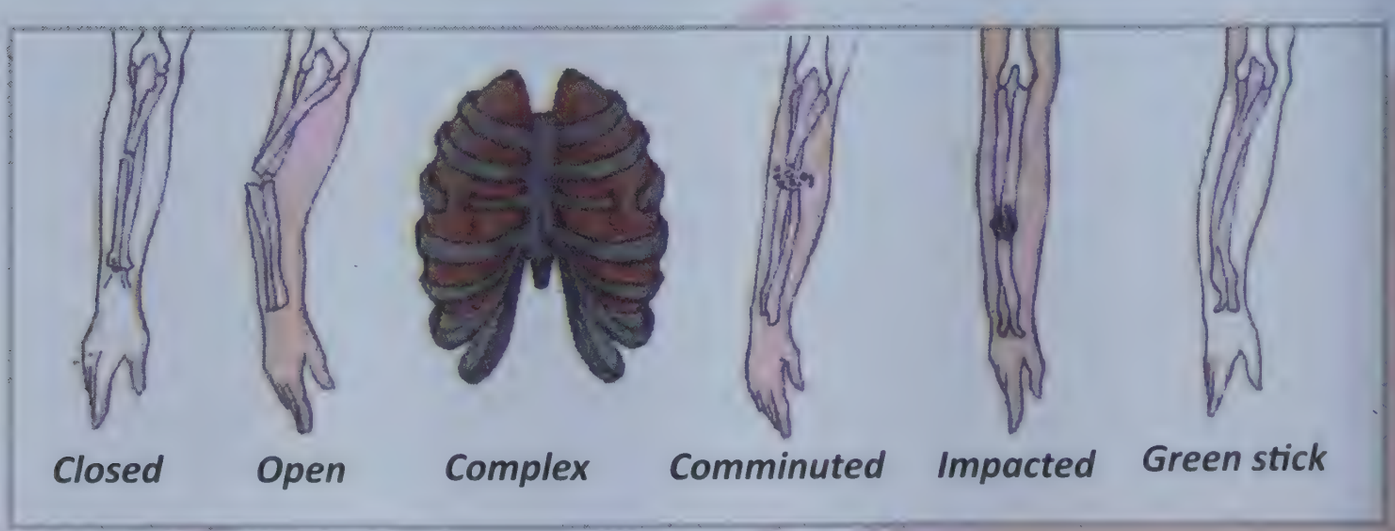
What to do

- Immobilize and support the injured joint in comfortable position.
- Never try to reset the dislocated bone and avoid movement.
- Apply cold pack to reduce pain and swelling.
- Reassure the casualty and immediately arrange medical help.

Fracture

Any break, crack or bend in a bone is called fracture. It may happen due to **Direct force** (bone breaks at the point of impact), **Indirect force** (bone breaks at a point away from the point of impact) or **Muscular force** (violent contraction of muscles). Fractures are broadly of following types.

- **Closed:** when skin above the fracture is intact.
- **Open:** when bone ruptures the skin and bone is exposed.
- **Complex:** when broken bone damages surrounding tissues/organs.
- **Comminuted:** when bone is broken into many pieces.
- **Impacted:** when ends of broken bones enter into one another.
- **Greenstick:** when bone is bent or slightly cracked.



Signs and Symptoms- by Acronym (DUSTCLIP)

- **D**eformity of the fractured part.
- **U**nnatural movement of the fractured part.
- **S**welling at the site.
- **T**enderness at the site.
- **C**repitus at the site (cracking sound- NOT for first aider).
- **L**oss of strength of the fractured part.
- **I**rregularity of the fractured part
- **P**ain at the site.

What to do

- Don't move the broken limb/part unnecessarily.
- Reassure the casualty and keep him calm.
- In case of open fracture or wounds stop bleeding first.
- Immobilize the injured part with splints and bandages ** refer relevant chapter.
- Apply ice pack near injury, to reduce pain and swelling.
- Arrange medical help immediately.
- If not sure of fracture then also treat it as a fracture.
- Keep a watch on the casualty and guard against SHOCK.

Jaw fracture

A jaw fracture can be caused by physical violence, accidents, sports etc. The broken jaw may also cause displaced or broken tooth. Sometimes jaw is only dislocated and moved out of its normal alignment.

Signs and Symptoms

The signs and symptoms depend on the severity of the injury.

- Pain in the jaw, which is severe on moving the jaw.
- Visible facial distortion or abnormality, in case of a severe injury
- Stiffness or abnormal movement of jaw from one side to the other
- Swelling with or without bruising
- Bleeding may be seen from the mouth
- Broken teeth and Salivation as difficulty in keeping mouth closed.

- Headache, Nausea and vomiting
- Difficulty in breathing if obstruction of the airways

What to do

Immobilization of Jaw

- If the casualty is bleeding from the mouth, ask him to spit it without putting effort.
- Never try to realign the jaw and immediately arrange medical help.
- Stop any bleeding by applying direct pressure on the affected area, using a clean cloth.
- Apply an ice-pack on the affected area
- Support the jaw by firmly tying a bandage around the head and below the jaw, as illustrated above.
- In case of vomit, remove the bandage to permit the same and reapply again.
- Collect the broken teeth, if any, without touching the root. Wash them with water or milk and keep in water, milk or saliva, to be taken to dentist.
- Guard against choking and shock which may occur due to bleeding in the mouth.

Collar bone/ Clavicle Fracture

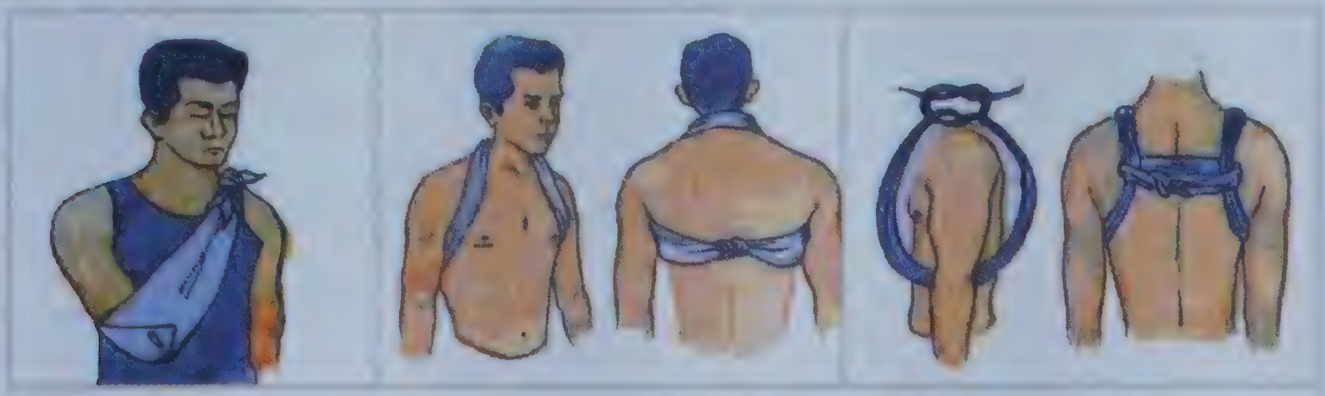
The collar bones join the shoulder blades to the breastbone to support the arms. Its fracture is usually due to an indirect force e.g. a fall onto the outstretched hand or fall onto the shoulder.

Signs and Symptoms

- Pain which increases by any movement of the arm and Swelling.
- Tingling, Numbness and Weakness in the hand.

- Casualty tilts his head towards injured side.
- Affected shoulder appears lower than the normal side.
- Obvious deformity if broken ends of bone are displaced.
- If fracture is near the sternum, then shortness of breath or difficulty in swallowing

What to do



Single bone fracture *Both bones fracture 1** and 2***

- Make the casualty sit and ask him to support elbow on the affected side with his other hand.
- Loosen any clothing that may be adding to the discomfort.
- Place a cloth pad in the armpit of the injured side.
- Place the affected arm diagonally across chest with the fingertips on the opposite shoulder.
- Support the affected arm with triangular sling.
- Secure the sling in place with a broad bandage around the affected arm and the trunk.
- If both collar bones are fractured then use methods as illustrated above**
- Guard against shock and keep a watch on breathing.
- Arrange transport to a medical help.

Upper arm Fracture

The upper arm has one bone called **Humerus** that runs from the shoulder to the elbow. It connects the scapula (shoulder blades) and the two bones of the lower arm, the radius and ulna. Its fracture is mainly caused by direct force.

Signs and Symptoms

- All usual sign and symptoms of fracture.
- Severe pain at the site while moving hand.

What to do

With splint *Body as natural splint*

- Make the casualty sit and assure him.
- Stop any bleeding, if there.
- Support the forearm in arm sling and put splint on outer side of the injured arm long enough to reach beyond shoulder and elbow joints.
- Now, secure the splint firmly with two narrow bandages tied above and below the fracture.
- Fix the arm with a broad bandage tied around the chest and injured upper arm while keeping the other hand free.
- OR alternately, use body as natural splint as illustrated above.
- Guard against shock and arrange transport to a medical help.

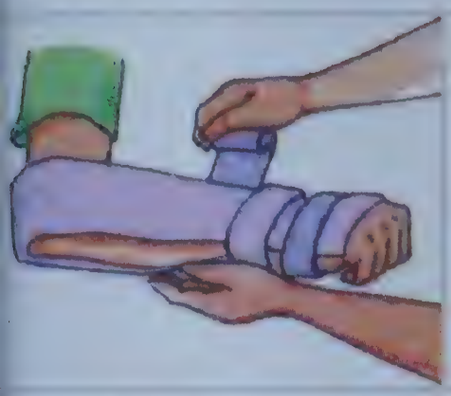
Fore-arm Fracture

This is mainly due to direct force through falls or accidents. Fore arm has two bones viz. **Ulna** (extending from elbow to wrist on little finger side) and **Radius** (extending from elbow to wrist on thumb side). The fracture may involve any or both of the bones.

Signs and Symptoms

- All usual sign and symptoms of fracture.
- Movement of the forearm is impossible and may be shortening of the limb.

Vhat to do



*Using SAM splint**

Using Wood splint

Body as Natural splint

- Make the casualty sit and assure him.
- Stop bleeding, if there.
- Gently bend the injured arm from elbow and put splints on both sides of the forearm long enough to reach beyond finger tips and elbow joint.
- Secure the splints firmly while keeping the arm supported.
- Support the affected arm with arm sling.
- OR alternately, use body as natural splint as illustrated above.
- Guard against shock Arrange transport to a medical help.

Structural Aluminium Malleable (SAM) is a ready-made splint.

ip/ Thigh Fracture

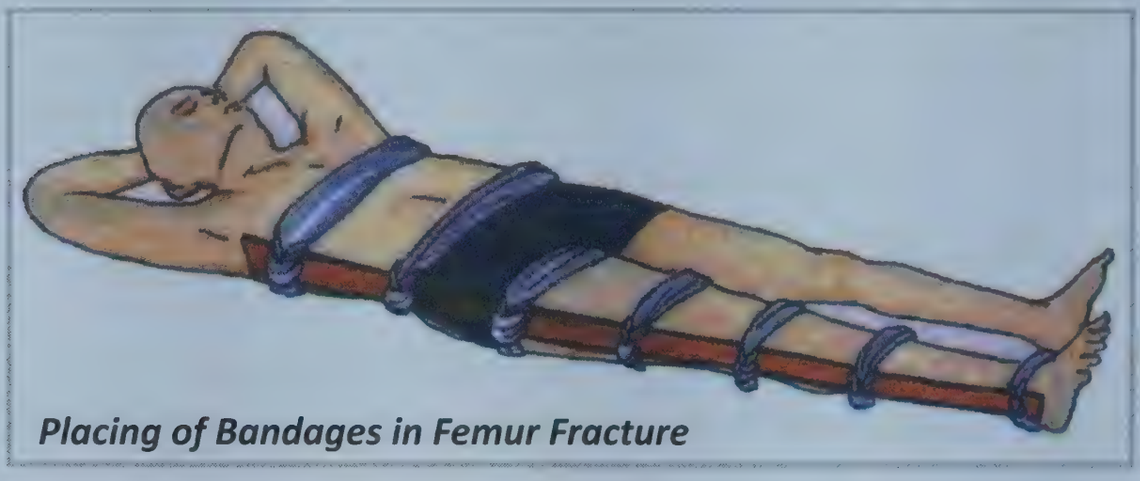
hip fracture occurs in the upper part of the thigh bone called **Femur.** he hip joint consists of the head of femur inserted into a socket made om the bones of the pelvis. A hip/ thigh fracture can damage rrounding pelvic region, muscles, ligaments, tendons, blood vessels nd nerves with complications that can be life-threatening. It can be aused by a fall, accidents or crush injuries.

ign and Symptoms

- All usual signs and symptoms of fracture.
- Inability to put weight on the leg of the injured hip, some people can still walk.
- Leg become shortened and externally rotated so the foot faces outwards.

What to do

Hip/ thigh fracture involves femur which is the longest bone of the body, so its fracture can cause heavy blood loss due to internal bleeding leading to shock and lots of complication later on. A very prompt and proper approach is required for this fracture.



Placing of Bandages in Femur Fracture

- Help the casualty to lie on his back and reassure him.
- Stop bleeding, if any and call for medical help.
- Place a splint long enough to extend from armpit to the feet.
- Fix the splint (preferably both legs together) by tying bandages at seven places viz.

1. Under armpits
2. On the abdomen
3. Above the suspected fracture site
4. Below the suspected fracture site
5. On the knees
6. On the calves
7. On the feet

- Apply a cold compress on the affected area in order to reduce swelling and pain.
- Guard against shock and keep a watch response, breathing and pulse.

Lower leg Fracture

Lower leg has two bones viz. **Tibia** (extending from knee to ankle in the front of the leg) and **Fibula** (extending from knee to ankle in the back side of leg). This fracture is mainly caused by direct force.

Signs and Symptoms

- All usual sign and symptoms of fracture.
- Standing and Walking on the injured leg is not possible and shortening of the limb.

What to do

Wooden plank used as splint

- Make the casualty lie on his back and assure him.
- Look for any bleeding, if there, stop it.
- Put splint extending from the knee to the feet and secure it with bandages at knee, above the fracture site, below the fracture site and ankles.
- If using body as splint then keep padding between knees and ankles to avoid rubbing of knees/ankles.
- Guard against shock and arrange transport to a medical help.

Vertebral column/ Backbone Fracture

The backbone keeps the body posture and it also keeps the spinal cord safe inside it. Any injury to backbone may damage the spinal cord and can cause paralysis of body or other complications in body functioning. The common causes of backbone injury are crushes, falling, twisting or bending.

Signs and Symptoms

In case of backbone injury there are **seven key things** to look for:

If the vertebral column is fractured.

1. Pain in the neck or back or lower back.
2. Deformity or twist in the normal curve of the spine
3. Dis-coloration in the skin over the spine

If the spinal cord is also damaged (this is very serious)

4. Loss of control over limbs.
5. Loss of sensation or abnormal sensations e.g. burning or tingling.
6. Loss of bladder and/or bowel control.
7. Difficulty in breathing.

What to do

Keeping the neck straight ***Support with paddings*** ***** Jaw Thrust for unconscious casualty***

- Assume that there is an injury to spinal cord and keep the body straight to avoid any movement that may cause spinal injury.
- Reassure the casualty and ask him not to move.
- Call for an ambulance or ask someone else to call for ambulance.
- Stop head or neck from moving to prevent further damage.
- To do this, kneel behind the casualty head. Rest your elbows on the ground or on your knees to keep your arms steady. Grip and hold each side of casualty head without covering the ears, so that the head, neck and spine are in a straight line
- Ask someone to put rolled-up blankets, towels or clothes on either side of the head to support it. Keep the head supported until emergency services take over.
- Attend to any bleeding or injury and keep checking for breathing, pulse and response.

If casualty is unconscious

- Open the airway using the **Jaw-Thrust Technique**** i.e. put your fingertips at the angles of the jaw and gently lift to open the airway, avoiding tilting the neck as illustrated above.

- If breathing, continue to support the head and call for an ambulance.
- While waiting for help, keep checking for breathing, pulse and level of response.
- If not breathing, start CPR.

Messengers of Peace

In our present world, we all have a role and the possibility to create a peaceful community to live in, a peaceful society for our family and a peaceful world to be brothers and sisters together.

Becoming a Messenger of Peace, it is a "personal journey". Maybe you are not a Scout, but still you can share the message and create Peace for your community.

Messengers of Peace

Join us to share your peace journey.
Login to **www.scout.org** to post your service.

for details mop@bsgindia.org

Free Being Me

Introduction

Free Being Me is an innovative Educational Programme for young Boys and Girls of 5 to 18 years age created by WAGGGS in partnership with Dove Self Esteem Programme Project. This programme is based on the latest research into how to increase young people's body confidence & self esteem through fun and non formal activities.

In last 10 years more than 100 countries around the world are working with this Educational Programme. 2014 onwards the Bharat Scouts and Guides is a part of this Educational Programme.

for details freebeingme@bsgindia.org

WHY FREE BEING ME?

Low body confidence stops children and young people from:

- Developing skills in activities they would enjoy
- Voicing their opinions.
- Taking risks.

HEAT RELATED INJURIES

Heat is a form of energy and when body is exposed to higher heat or to very low temperature by external sources it can cause variety of injuries or illnesses. We being hot blooded also develop complications by any deviation from normal range of body temperature. The heat related injuries are diverse and cause complications up to death.

Burns

These are the injuries to the skin and underlying tissues due to heat. Absence of heat i.e. extreme cold can also give cold burns or frost bites. Burns can cause infection, low blood volume, low body temperature, breathing difficulty, disability and even death. Burns can be differentiated by their cause viz.

- **Burn** is the injury caused by direct fire; hot objects e.g. hot metal or friction e.g. ropes.
- **Scald** is the injury caused by steam or hot liquid. It gives only up to second degree burns.
- **Electric burn** is the injury caused by electric current or by lightning.
- **Chemical burn** is the injury caused by chemical substances/ liquids/ gases.
- **Radiation burn** is injury caused by radioactive sources e.g. X-rays or other radiations.
- **Sun burn** is caused by exposure to sunlight or sunlamp.
- **Frost bite or cold burn** is injury caused by exposure to very cold wind, subzero cold temperature or contact with freezing materials or vapors.

Based on the intensity burn injuries are basically classified into three degrees viz.

- **First degree:** Injury only till first layer of skin; skin gets red and swollen.
- **Second degree:** Injury till second layer of skin; blisters appear and they are very painful.

- **Third degree:** Injury till third layer of skin; skin is black leather like and dry. No pain since pain receptors in the skin are damaged.

hat to do in case of Minor burns

- Make yourself and casualty safe and reassure the casualty.
- Put the burnt part under running water or put it in water for 10-15 minutes or until the burning sensation ceases. This prevents the burn from going deeper and reduces pain.
- Remove things which may hinder blood circulation due to swelling of body part e.g. bangles.
- Cover the burnt part with a sterile bandages, clean cotton cloth or plastic film to avoid sticking of the material to the burnt .
- Elevate the burnt part if possible.
- Keep the person warm.
- Don't touch the wound or open the blisters.
- Don't apply anything on the burnt part.
- Keep an eye on the casualty and arrange for medical help

ool the brunt part for 10-15 minutes

Apply bandage loosely

hat to do in case of severe burns

vays remember any burn covering area more than of a palm size is ere and serious, irrespective of degree of burn. Any severe burn can use shock.

Cover with non-sticky material e.g. plastic film

- Don't put water on the injured part.
- Don't apply anything on the injured part.
- Cover the wounds with sterile bandage, clean cotton cloth or plastic film to avoid sticking of the material to the burnt .
- Keep the burnt part elevated.
- Never try to remove the cloth sticking to the burns.
- Keep the person warm.
- Guard against Shock and immediately arrange medical help

In case of chemical burns

Eye wash in chemical burn

What to do

- The skin may be dis-colored and peel off.
- Wear gloves or plastic bags and brush off the remaining dry powder or wash off the remaining chemical away from the body with plenty of running water for at least 15 minutes.
- In case of eyes wash the eye with running water for 5-10 minutes

and apply eye pad.
- Now treat as for the burns and seek medical help.

rson caught in fire

person's clothes can catch fire by direct contact with the fire or by ntinuous and long exposure to a heat source. A prompt action can not ly save a life but can also reduce the severity of burn.

our own clothes are on fire then do–**Acronym(SCDR)**

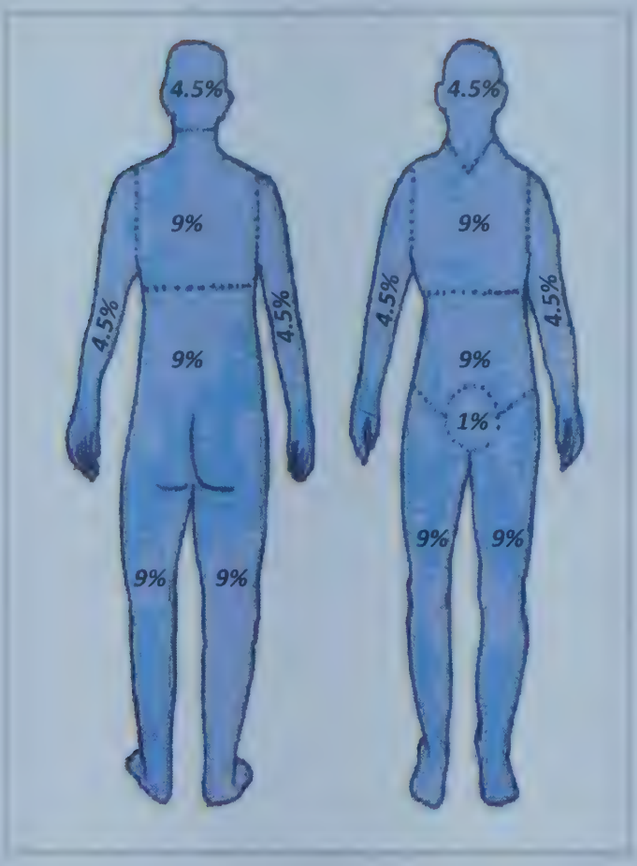
- **Stop:** Do not panic, stop on the spot as running gives more air to fire to increases the flames.
- **Cover:** Protect your eyes and face with your hands. It also protects you from inhaling smoke.
- **Drop:** Immediately drop to the ground.
- **Roll:** Smother the fire by rolling forward and backward. It cuts the oxygen supply to the fire.

omeone else is on fire

ossible, ask him to do the **SCDR.** Else, carefully move from the kside of the person and try to wrap him in a fire blanket, thick nket, non-flammable mat or thick clothing and then push him down he ground. Now roll him on the ground. Douse the fire with water. member, **do not use any type of fire extinguisher except the Water e Extinguisher.** Once the fire is doused treat the person for burns, cks and other injuries if any. Immediately call for medical help.

e of Nines for Burns (Wallace Rule of Nine)

e rule of nines is a quick method to estimate the extent of a person's n injuries. It is also known as the Wallace rule of nines after Dr. xander Wallace, who first published this method. In this method the mate of the burned body surface area is done by using multiples of 9 body is divided into 11 parts each having 9 percent of the body face area. The rule is adjusted for child due to difference in body portion i.e. child head is taken as 18% and legs as 14% each, ignoring genital.



Rule of Nines

Body is divided into 11 parts eac
having 9% of the body surface area.

1.	Head and neck	:	9%
2.	Chest	:	9%
3.	Back of chest	:	9%
4.	Abdomen	:	9%
5.	Back of abdomen	:	9%
6.	Front of Arms	:	9%
7.	Back of Arms	:	9%
8.	Front of right leg	:	9%
9.	Back of right leg	:	9%
10.	Front of left leg	:	9%
11.	Back of left leg	:	9%
12.	Genital	:	1%
	TOTAL	:	**100%**

Rule of Nines: Calculation

Frost bite (cold burn)

It is caused by exposure to extreme cold temperature, cool winds c
contact with freezing material or vapors. It may cause complicatior
and in severe cases amputation may be required.

Signs and Symptoms

- The affected part becomes numb and white.
- Severe pain with tingling sensation.
- The sense of touch is reduced.
- In severe cases skin becomes soft, swollen and red with blisters.

What to do

- Shift the casualty to warmer place.
- Replace wet cloths with dry and soft clothing.
- Remove things which may hinder blood circulation due t
  swelling of body part e.g. bangles.
- Warm the affected part by covering with cloth, holding betwee
  hands, keeping inside armpits or in the lap for at least 30 minute
  or until it becomes pink having better sensation.
- If available, dip the injured part in body temperature warm wat
  for at least 20-30 minutes.

- Never rub the affected part as it may damage skin .
- If required, bandage each finger separately and loosely.
- Arrange medical help.

Heat Exhaustion

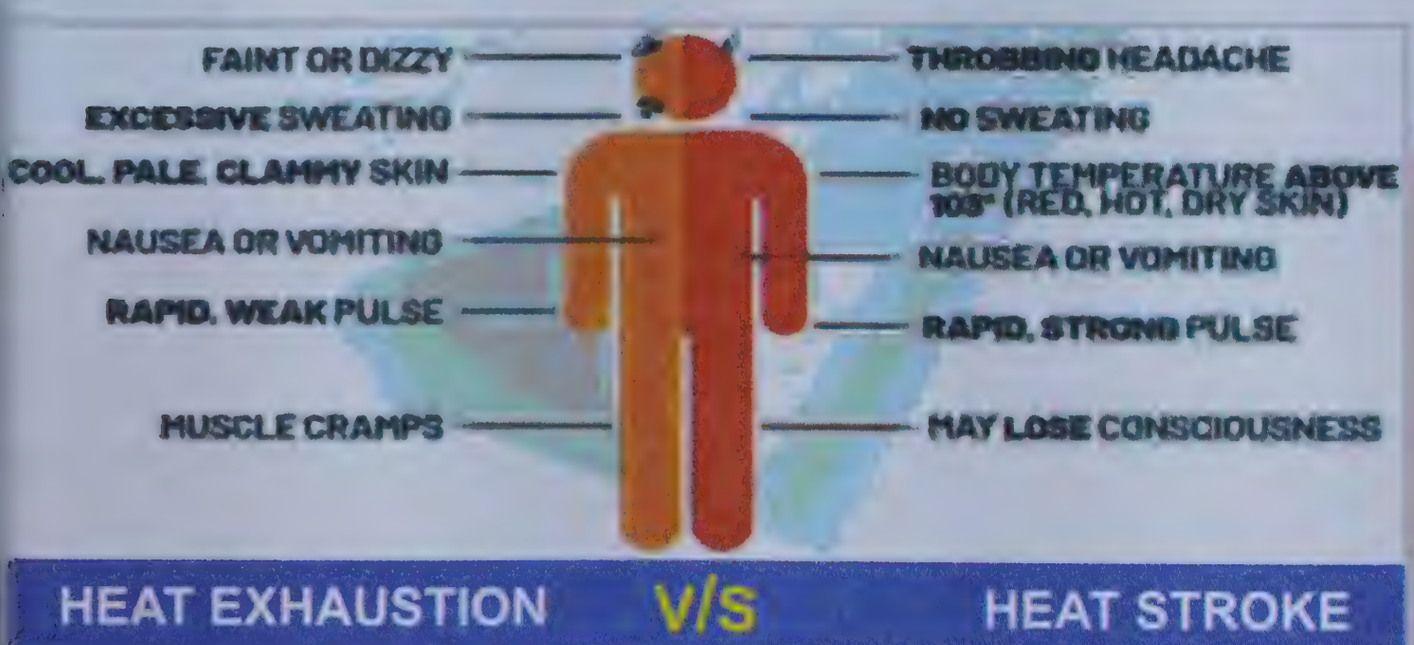
Heat exhaustion is caused by a loss of salt and water from the body, usually through excessive sweating due to exertion or hot environment. A common cause of heat exhaustion is that the body produces more heat than it can cope with. If treated quickly, heat exhaustion patient feels better quickly. But if not treated, it may develop into heatstroke which can lead to death.

Signs and Symptoms

- Headache, Dizziness and Confusion
- Sweating with pale, cold and clammy skin
- Fast but weak pulse and shallow breathing
- Nausea and/or Vomiting
- Cramps in the arms, legs and stomach.

What to do

- Take casualty to a cool place, lie him down and raise the legs.
- Loosen the cloths and ensure fresh air.
- Give lots of water or Oral Re-hydration Solution to help replenish the loss of salt and fluid.
- Keep checking the breathing, pulse and level of response.
- After recovery, suggest seeing a doctor.
- If things getting worse call for medical help.



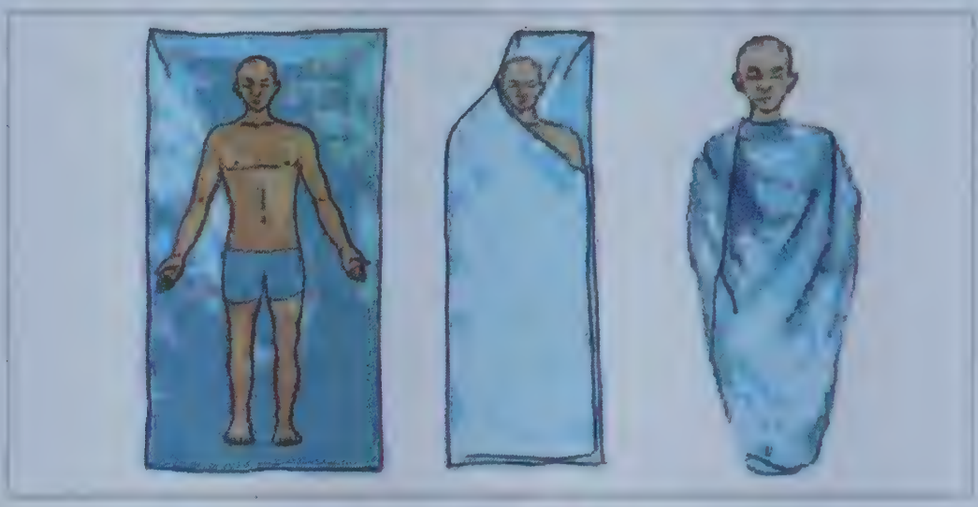
Heat Stroke/ Sun Stroke

Heatstroke is caused by a failure of the thermostat in the brain which regulates the body temperature. If someone has a high fever or has been exposed to heat for a long time, then body can become dangerously overheated. This causes dehydration, sweating is stopped which means the body can't cool down anymore, so heatstroke develops. Heat stroke can cause unresponsiveness within minutes.

Signs and Symptoms

- Body temperature above 41°C (106°F)
- Headache, dizziness and discomfort
- Hot, Red and Dry skin (no sweating)
- Restlessness and Confusion
- Rapid and strong pulse
- Fast deterioration in the level of response (may become unconscious)

What to do



Full body Wet Sheet Wrap

- Quickly move the casualty to a cool place and remove outer clothing.
- Call for an ambulance.
- Give full body wet sheet wrap to the casualty and keep it wet until body temperature falls to at least 38°C (or 100.4°F).
- If sheet is not available, fan and sponge him or put cold compresses.
- Keep the head lower and elevate legs.

- Once the temperature is around 38°C, replace the wet sheet with a dry sheet.
- Give lots of fluids to him.
- Keep checking the temperature, breath, pulse and level of response.
- If casualty starts getting hot again, repeat the cooling process to lower the temperature.
- If casualty loses consciousness, treat as for unconscious.

Hypothermia

Hypothermia happens when the body temperature drops below 35°C (95°F). It can become life threatening quickly, so it's important to treat hypothermia straight away. Hypothermia could be from staying outdoors in cold conditions, falling into cold water or from living in cold indoors.

Signs and Symptoms

- Shivering, cold, pale and dry skin
- Tiredness and confusion
- Slow and shallow breathing
- Slow and weak pulse

What to do

Hypothermia Wrap

- If possible get the casualty indoors.
- Change the wet clothes into dry clothes. Make sure the head is covered too.
- Cover him with layers of blankets and warm the room to about

25°C (77°F).

- Give him something warm to drink like soup and high energy food, like chocolate.
- If can't move the casualty indoors; keep something underneath him to protect from cold ground and wrap something around him.
- If unresponsive, open the airway, check breathing and treat as for unconscious.
- Keep checking the breathing, pulse and level of response and arrange medical help.

SPEAR 4.5 MILLION SCOUTS

The Bharat Scouts and Guides is affiliated to the World Organization of the Scout Movement and is the only National Scout Organization in the country with large membership and having enormous potential for the Growth. Total Population of the Young People in India is 25,76,41,834 and present Scout Membership is 35,81,332. There are over 254 million untapped available young people who need to be attracted to Scouting.

This project aims to achieve over 4.5 million young people by 2023 and further 6.0 million Scouts by 2025.

STINGS, BITES AND POISONS

A **Sting** is a small sharp and pointed organ at the end of the abdomen/tail of bees, wasps, ants and scorpions which they use to injects poison in the body of sufferer giving a painful wound. A **Bite** is a lacerated or punctured wound caused by animal teeth. The stings and bites are very common and mostly create mild consequences but sometimes they may create life threatening conditions. While **Poison** is any substance that if taken in sufficient quantity is harmful to the health and can even cause death. The consequences of poisoning depend on the quantity and potency of the poison.

Insect Stings and Bites

Most reactions to insect stings are mild, causing little more than redness, itching or minor swelling. However, insect sting in the mouth or throat can be serious as it could lead to swelling of the airway and obstruction. Multiple stings can also pose life threatening anaphylactic (allergic) reaction. **Some insects bites may carry disease like yellow fever, scabies, dengue, bubonic plague etc.**

Signs and Symptoms

- Redness and Pain at the place of sting/ bite.
- Swelling and Irritation at the place of sting/ bite.

What to do

- Move to a safe area to avoid more stings/ bites.
- If possible remove the sting with forceps or card without squeezing the sting.
- Wash the area with soap and water.
- Apply ammonia/calamine lotion/apple vinegar or baking soda on the sting site.
- Apply a cool compress at least for 10 minutes to reduce pain and swelling.
- If the sting is in mouth or throat, give ice cube to suck or sips of cold water to reduce pain and swelling.
- If the sting is on an arm or leg, elevate it.

- If signs of severe allergic (anaphylactic) reaction** appear, call medical help.
- in case of insect bite clean the area with antiseptic lotion and apply ice pack

Removing sting with a credit card

Removing sting with a forceps

**** In case of severe allergic (Anaphylactic) reaction**

- Difficulty in breathing and Rapid heartbeat
- Swelling of the lips, eyelids or throat
- Dizziness, faintness or confusion
- Cramps, Nausea or vomiting
- Patches on skin

What to do

- Reassure the casualty and arrange medical help immediately.
- Remove stings and apply ammonia/baking soda or ice packs.
- Loosen tight clothing and cover the person with a sheet/blanket.
- Guard against shock and don't give anything to drink.
- Keep a watch on breathing, pulse and level of response.

Animal bite

Bites from sharp, pointed teeth cause punctured or lacerated wounds and allow germs to enter into the skin causing infections and diseases

e.g. bite from a mammal can cause rabies in humans. Therefore immediate treatment of animal bite is required to stop bleeding and to prevent a risk of infection.**Human bite poses a small risk of getting hepatitis or HIV infection so seek medical help.**

What to do

- Wash the wound thoroughly with soap and water for 10 minutes to reduce risk of infection.
- Raise and support the wounded part and cover the wound with a sterile/ clean dressing.
- If the wound is large or deep, stop the bleeding.
- Seek medical help to counter risk of rabies or any infection.
- If possible keep a watch on the animal for 10 days that bit the casualty, to see if it develops symptoms of rabies.

Snake Bite

A snakebite is an injury caused by the bite of a snake. A bite from a venomous snake is poisonous but sometimes poisonous snake gives dry bite i.e. bite without release of venom in the human body. Still dry bite or a bite from non-venomous snakes can cause infections and irritations due to presence of microbes in their saliva. Remember, only about 15% snakes worldwide are dangerous to humans.

Snake venom is usually a combination of several different types of toxins that kills or injures the tissues and organs through its chemical actions. Some of the toxins present in snake venom are:

- **Neurotoxins:** They cause paralysis of voluntary muscles and nervous disorders.
- **Haemotoxins:** They destroy red blood cells
- **Coagulants**: The cause blood clotting.
- **Anticoagulants** :They stop blood clotting process.
- **Cytotoxins** :They destroy cells.

Signs and Symptoms

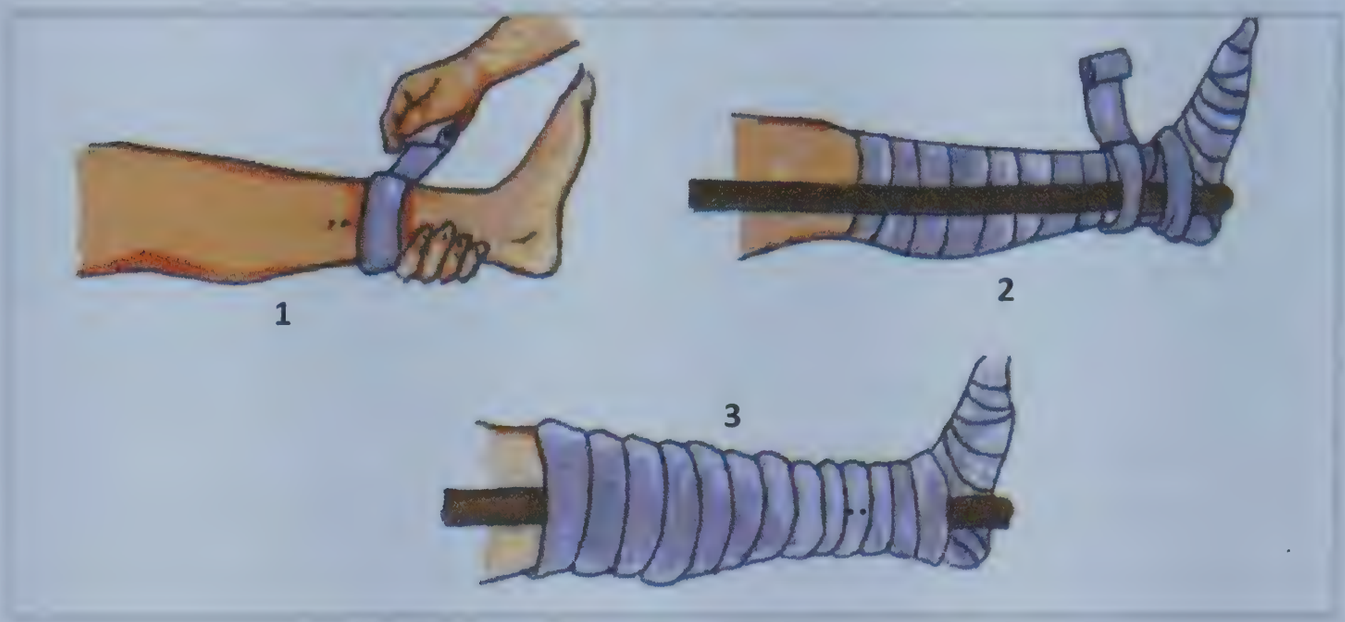
Most snakebites occur on the extremities i.e. hands and legs. The sign and symptoms depend on the type of toxin present in the snake.

- Presence of two punctured wounds from the animal fangs.

- Pain and later severe burning pain at the site within 15 to 30 minutes.
- Swelling and bruising at the wound and may move up in the limb.
- Rapid pulse, Low BP and Shock.
- Difficulty in breathing, Convulsions, Sweating and Diarrhea.
- Dizziness, Fainting, Nausea, Headache, Blurred vision and Loss of consciousness.

What to do

Snake venom is carried in the **lymphatic system** and not in the blood stream. The venom moves in the lymphatic system when the limb moves and that's why here the aim is to **reduce lymphatic flow by applying Pressure Immobilisation Technique (PIT).**



Pressure Immobilization Technique**

- Move beyond the striking distance of the snake
- Remain calm and tell the casualty that most snake bites are harmless.
- Call medical help immediately, if possible.
- Make the person lie down keeping wound below the heart.
- Keep the person calm and as still as possible to keep venom from spreading
- Loosen any tight clothing or ornament from the infected part before swelling occurs.
- Clean the wound with soap and water.

- Cover the wound with loose, sterile bandage.
- Immobilize the entire limb with **Pressure Immobilisation Technique**** OR tie compression bandage firmly up the entire limb. The immobilisation should be firm enough to reduce lymphatic movement without hindering blood flow. Leave the tips of the toes/fingers out to monitor blood circulation. Put" **X**" mark on the bandage, where snake bit.
- If bite is on hand use sling to restrict movement.
- Re-assure the casualty and guard against Shock.
- Keep an eye on breathing, pulse and response level of the casualty.
- If it is safe, take a picture of the snake or make note of some characteristics of the snake.

Always remember

- Never try to capture the snake.
- Never cut or burn a bite wound
- Never attempt to suck out venom
- Never give any pain killer.
- Never give caffein/alcohol, this speeds up absorption of venom.

Poison

Poison is any substance that if taken in sufficient quantity can kill or injure an organism through its activity. The poison can enter the body through various methods viz.

- **Ingested Poisons:** These poisons enter the body by mouth and include medications, cleaning products, pesticides, plants etc.
- **Inhaled Poisons:** These poisons are breathed into the lungs include gases and fumes e.g. carbon monoxide, chlorine, pollutants and fumes of paints or cleaning solvents etc.
- **Dermal Poisons:** These poisons are absorbed in the body through the skin. They include plants such as poison ivy, poison oak and insecticides etc.
- **Injected Poisons:** These poisons get into the body through stings or bites of bees, wasps, insects, spiders, animals, snakes etc. or as drugs injected with a needle.

Signs and Symptoms

Poisoning signs and symptoms can be similar to many other conditions, such as seizure, alcohol intoxication, stroke or insulin reaction. So if poisoning is suspected look for **clues** like empty container, bottle, pouch, scattered pills, needles etc. and **signs** like burns, stains, vomit, smell etc. The common sign and symptoms are:

- Known to have taken overdose of medications or have taken any other substance intentionally, accidentally or forcibly.
- Burns or bruises around the mouth and lips
- Breathe that smells like chemicals.
- Vomiting, Diarrhoea, Abdominal pain
- Difficulty in breathing or not breathing.
- Confusion, Drowsiness and Restlessness
- Seizure or Unconsciousness.

What to do

- Call emergency medical help.
- Look for the container, pills, pouch, wrapper, needle etc. to identify the poison.
- If casualty is unconscious and breathing, put in recovery position.
- If casualty is unconscious and not breathing, give artificial respiration.
- If casualty has no pulse, give CPR.
- For **ingested poisons,** remove anything remaining in the person's mouth and do not induce vomiting as this may cause further injury to the airway if the poison is corrosive. Do not give fluids to drink as some substances may react adversely.
- For **inhaled poisons** move the person to fresh air immediately and treat as required.
- For **absorbed poisons** clean the affected body part with running water. Any chemical powder must be first brushed off with a cloth and then treat as required.
- For **injected poisons** remove the object (needle/sting) and then treat as required.

- Follow the instructions on the container etc. even if matter seems to be non-serious.
- Keep an eye on the breathing, pulse and response level of the casualty.
- Manage the casualty as per the symptoms.
- In case of vomiting tilt the head to avoid choking.
- Stay with the person and monitor the condition while waiting for the medics.
- Keep container, pouch, pills i.e. suspected poison and handover to the medics.

MOVING A CASUALTY

In the first aid moving a casualty is always required and it involves **Turning, Lifting** and **Carrying** the casualty during the diagnosis, treatment and disposal. The proper positioning of the casualty during diagnosis and treatment; and a speedy transportation to a medical facility can prevent further complication and save life. These movements require proper training and practice, as an improper movement may worsen the scenario.

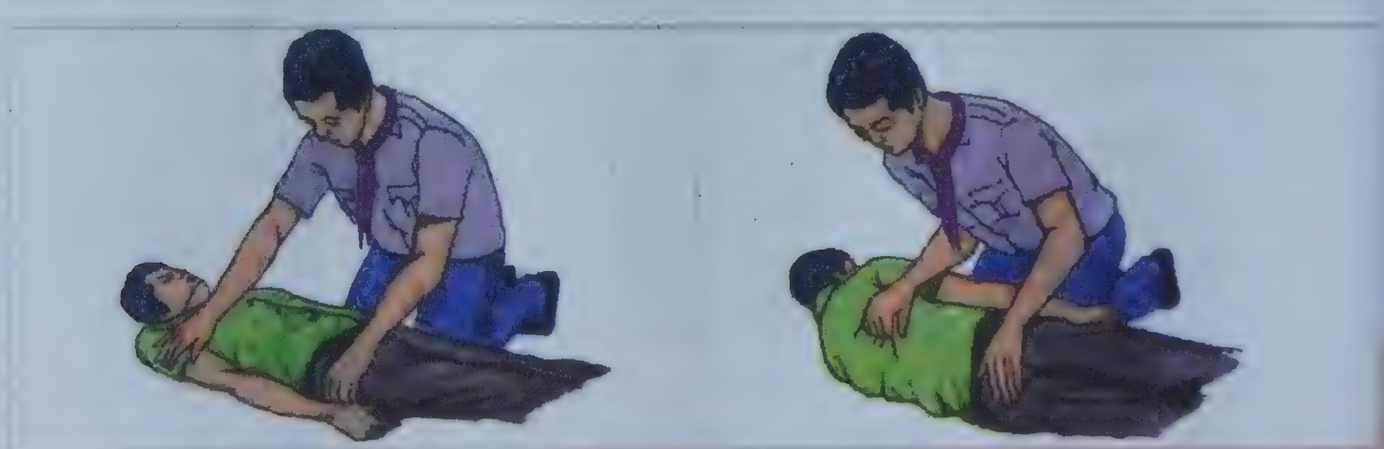
Why movement-Turning, Lifting and Carrying

- **Proper treatment** e.g. to reach to the back of head for diagnosis or for applying dressing etc.
- **Safety** i.e. taking away the casualty to safer place from hazardous surroundings.
- **Rapid medical help** i.e. carrying the casualty to ambulance or medical facility.

Turning a Casualty

Turning casualty may be required for first aid and it includes movement.

- From face down to face up position or vice versa.
- From resting on right side to left side or vice versa.



Turning the casualty

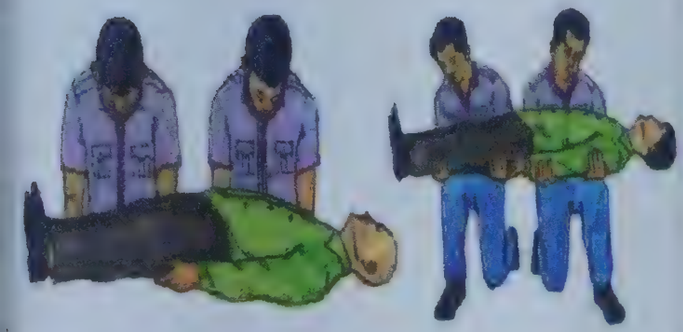
Lifting a Casualty

Lifting may be required to shift the casualty's position e.g.

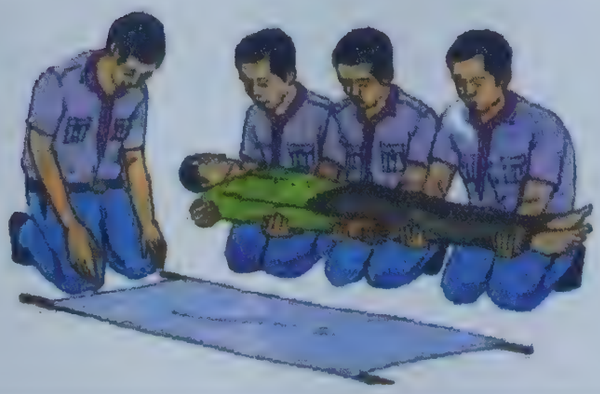
- From lying down to sitting position
- From lying down to standing position
- From lying down to putting on stretcher

Making the casualty sit

Making the casualty stand



Lifting the casualty



Putting casualty on stretcher

Before Turning or Lifting the casualty always remember:

- Make the movement only if necessary.
- Assess the type and location of the injury.
- Immobilize the body part before lifting, in case of fracture.
- Hold the casualty firmly and make sure that body remains straight and gets minimum jerks.
- In spinal injury avoid lifting as it requires special methods, if necessary keep body stretched & straight with least movements.

Carrying a Casualty

This is the most important movement in transport of the casualty and involves shifting:

- From the place of incidence to the medical facility.
- From the place of incidence to a safer place.

How to select a method to Carry

There are many deciding factors to select a carry method for a casualty. These factors must be properly addressed before carrying the casualty since any mistake may aggravate the injury.

- **Number of First aiders:** How many persons are available to carry the casualty.
- **Material/ Resource:** What is available to carry the casualty e.g. if stretcher is available then nothing like it, else wise use of available material is key to select the method.
- **Type of injury:** It is necessary that the injured part is moved to minimum and casualty must be comfortable, so method must be selected with due consideration to injury.
- **Weight of the casualty:** A heavy casualty is always a problem particularly for single carrier and for long distances, so need to be considered.
- **Distance:** Long distances are tough to cover with some method.
- **Terrain:** The type of terrain to travel e.g. bad road, hills, uneven path need to be considered.

Assessment of Victim

Assessment of the type of injury and response level of casualty is required to make the transfer safe, swift and more comfortable. Make sure that the casualty has been treated and ready for the transportation.

Methods to Carry

There are many methods, so after considering all the deciding factors as mentioned above and assessment of the casualty, the most suitable method is selected. Remember each method has its own merits and demerits.

One Man methods

These methods are used when only one first aider is available.

Human Crutch: It is used when casualty can walk with support. It is also used for casualty with injured foot, as the first aider lifts the injured foot (kept on his foot) to facilitate the movement.

Pick a Back: This can be used for long distances and is a very easy method to carry the casualty.

Human Cradle: This is used for light weight casualty and for short distances.

ire-man's Drag: This method is used by firemen for dragging the nconscious casualty out of a room, where hot air and gases are above ne ground and crawling keeps the persons safe from them.

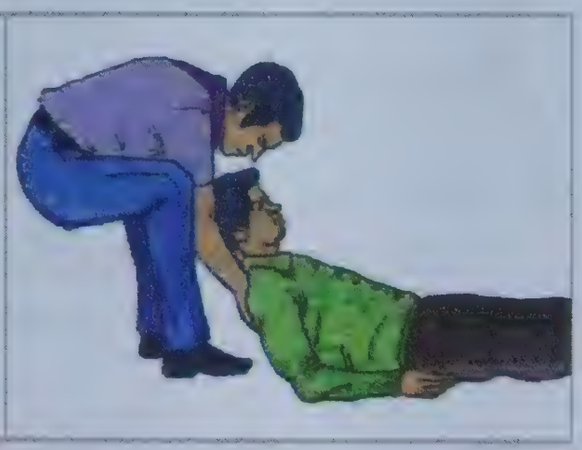
ire-man's Lift: It is also used by firemen for carrying the casualty when armful gases are near the ground and persons need to remain up to void gases. This method is very quick and easy to carry a casualty.

houlder/ Coat Drag: This is like fire-man's drag but in this casualty is ragged by gripping his coat or garment from the shoulders.

Human Crutch *Pick a Back* *Human Cradle*

Fire-Man's Drag

Fire-Man's Lift



Shoulder or Coat Drag

vo Men methods

ese methods require mutual trust and coordination between both e first aiders.

retcher: This is the most convenient and widely used requiring at least o first aiders.

Double Human Crutch: It is same as Human crutch but in this two first aiders assist the casualty.

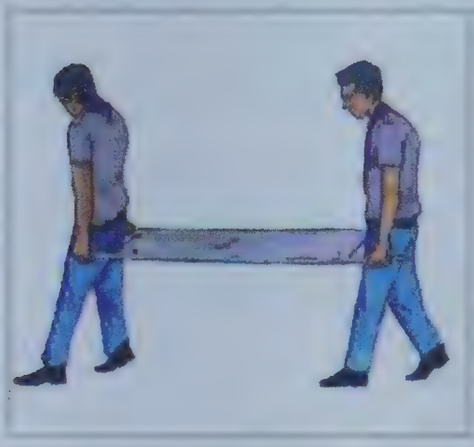
Chair Carry: It is convenient and comfortable method especially for casualty with abdomen injury.

Fore and Aft: This is an improvisation of chair carry method.

Two Hands Seat: It is used for light and unconscious casualty as free hands of first aiders can support the back of the casualty. The first aiders walk together by side pace. Always keep cloth between the clutches of hands to avoid slips.

Three Hands Seat: This is for conscious casualty as only one hand is available for back support.

Four Hands Seat: A heavier but conscious casualty can be carried with this method.



Stretcher

Double Human Crutch

Chair Carry

Fore and Aft

Two Hands Seat

Back side Grip

Three Hands Seat

Four Hands Seat

Always remember

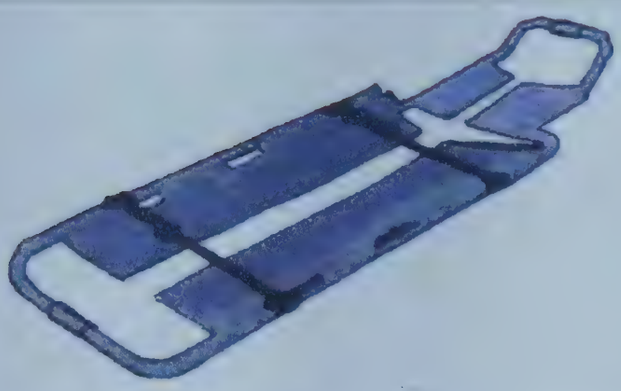
- Assess the danger to the casualty and yourself and take all belongings before proceeding.
- If situation is dangerous then don't proceed until experts arrive.
- Select the best possible method to carry the casualty after giving necessary first aid.
- Make sure that the casualty is comfortable and movement is not aggravating the situation.
- Strap/ hold the casualty properly to avoid fall off and avoid unnecessary movements.
- Bring the casualty under medical help as soon as possible.

Stretcher

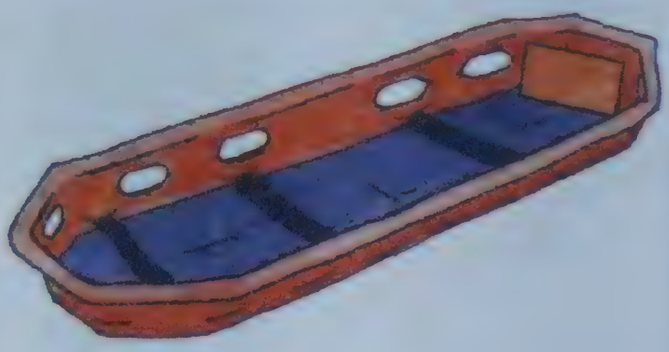
Stretcher is generally a sheet of canvas stretched on a frame which is used to carry a casualty. It is most comfortable, safe and widely used apparatus to move patient who requires medical attention. Typically a stretcher is carried by two or more persons. Some of the types of stretchers are illustrated below.

SIMPLE: General use

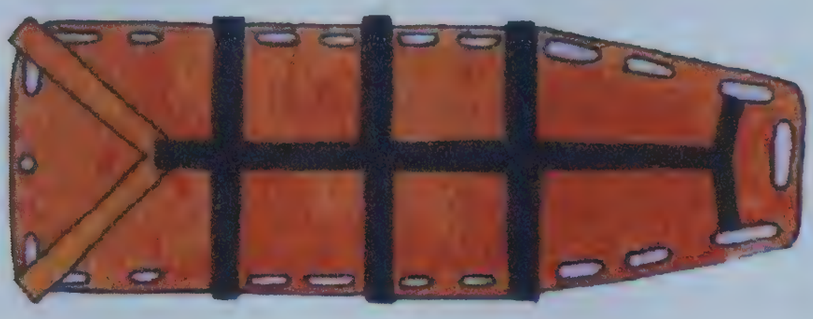
FOLDING: Compact/ Easy to store



SCOOP: Spinal injury/Can be detached as right and left half



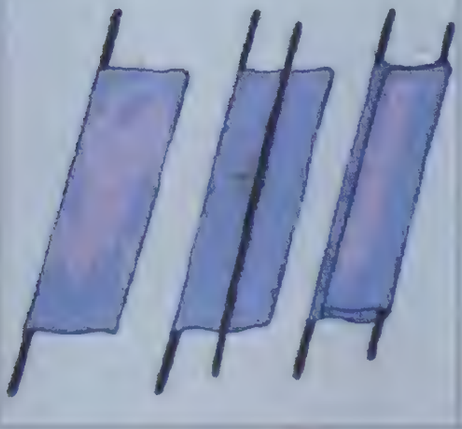
BASKET: Rescue purpose in narrow place/slopes etc.



SPINAL BOARD: Hard and flat for spinal injuries

Improvised Stretcher

A good first aider must know how to make best use of available resources. The unavailability of standard stretcher must not hinder or delay the rescue/ movement of the casualty. Any possible thing e.g. plank, door, cot, bed sheet, bamboos, ropes etc. can be used to make an improvised stretcher.



With Blanket & Bamboos

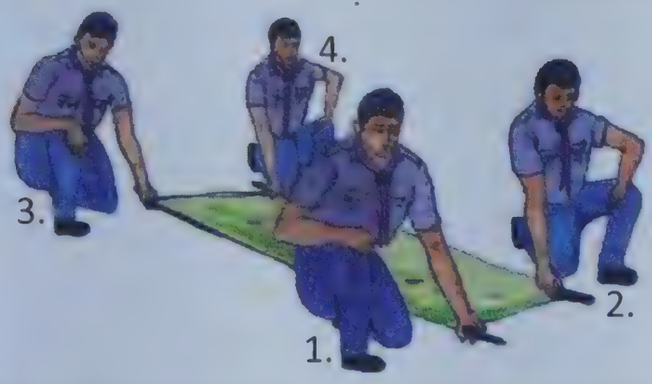
With Blanket & Ropes

With Bamboos and Shirts

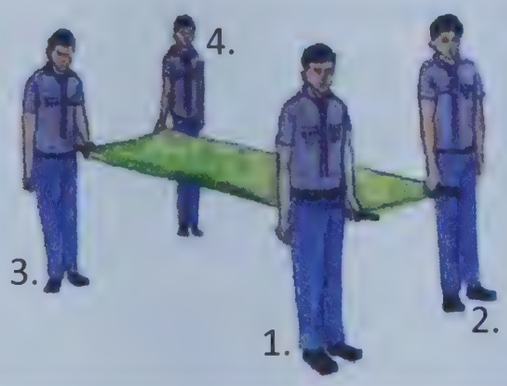
With Gunny bag/ Staircase/Ropes

Carrying a stretcher

Carrying a casualty on stretcher needs coordination among stretcher bearers. There can be 2 or 3 or 4 stretcher bearers. Time is very important so movements must be swift.



Lifting /Putting Down the Stretcher



Carrying the Stretcher

- Casualty must be properly treated and strapped/ fixed to the stretcher before moving.
- Keep all the belongings of the first aiders as well as of the casualty before moving.
- Keep the stretcher as level and stable as possible while lifting, putting down and moving.
- All stretcher bearers must first move the feet near the stretcher to start the march and move in co-ordination.
- Keep an eye at the patient face for discomfort or respiratory or circulatory problems.
- The casualty legs must be forward except in case of going upstairs and loading onto the ambulance where head is moved first.
- Leader is no. 1, second is no. 3, while no. 2 and 4 are members.

MUST KNOW

The subject of first aid is vast and it is ever evolving to keep pace with new medical complications and innovations. Every medical emergency is unique but the fundamentals, methodology and approach of first aid remain same for all the situations. This chapter covers some important and some relatively new aspects to enrich the knowledge of first aider.

Messaging in Emergency

In medical emergency first aider needs to call medical services for sending help. A brief, clear and complete message is very useful for the medics and in turn for the life of the casualty. The message must contain the following information.

- Name of the caller
- Exact location of incidence with landmark
- Number of injured person (s)
- Gender and Age of injured person (s)
- Description of injury with signs and symptoms
- First aid already given
- Current condition of the casualty
- Contact details of the caller

An example of Telephonic/ Verbal message

*This is **Rishona Singh (No. 98XXXXXXXX)** at Pitampura Metro station gate no. 5; a man around 40 years has got his thigh bone fractured. We have immobilized the thigh. No other injury. The person is conscious but having severe pain. Please send ambulance and medics immediately.*

An example of written message

To
Medical officer,
xxxxxxx Hospital

Thigh bone fracture, Male, 40 years, at Pitampura, Metro station gate no. 5. Immobilization of thigh done.

No other injury.
Person is conscious and having severe pain.
Please send ambulance and medics immediately.

Nyoma Singh (No. 98XXXXXXXX)

Triage

In disaster or battles where the number of victims is very large, the process of sorting the victims to determine medical priority in order to increase the number of survivors is called Triage. In simple words Triage is the process of deciding which casualty should be treated first based on severity of injury. Triage comes from the French word for sort. Its purpose is to rationing the limited medical resources when the number of victims needing first aid exceeds the resources available so that most needy persons get the benefits first.

Triage in disasters with large number of injured must always:

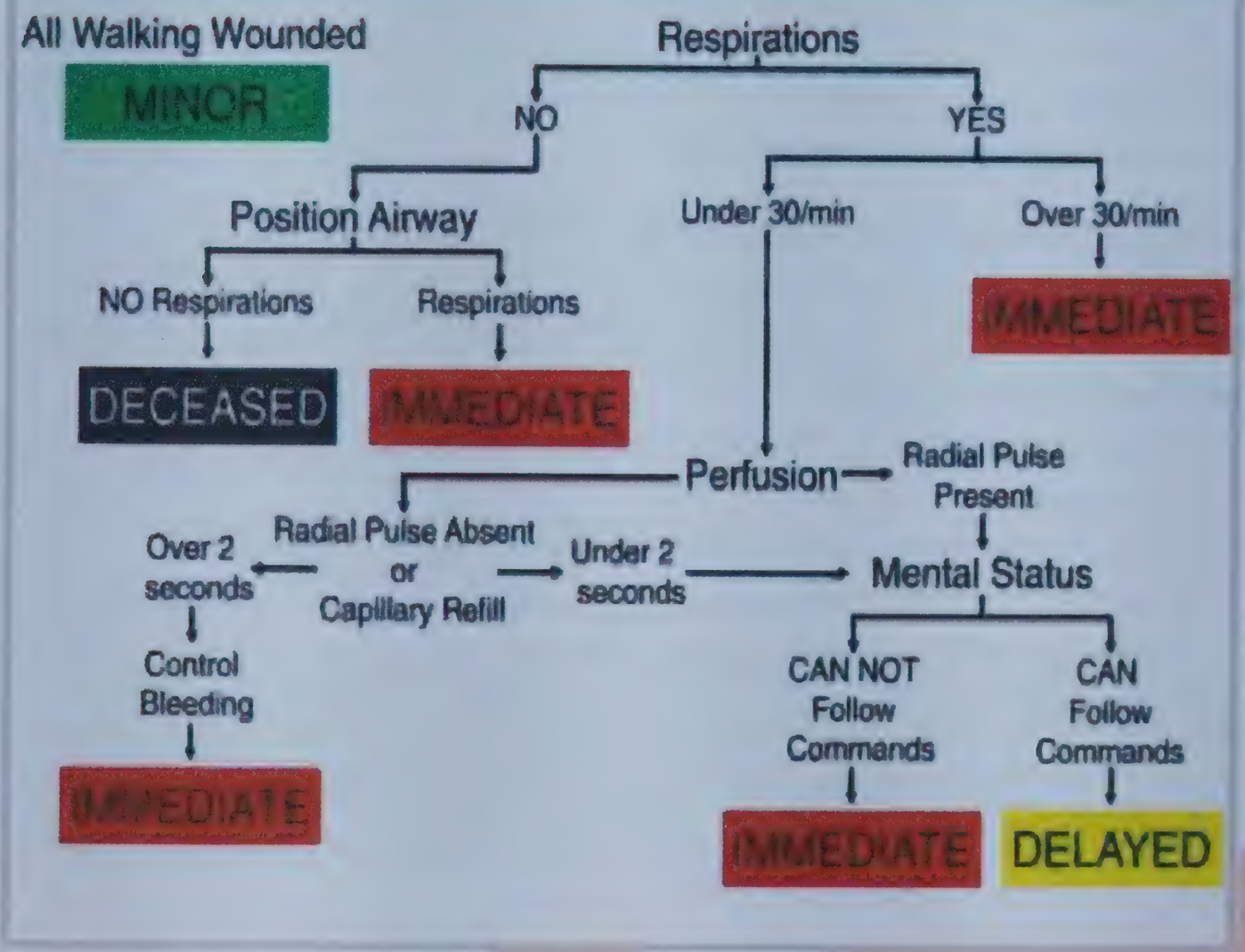
- Be prioritised over treatment means triage is to be done first.
- Prioritise those casualties most likely to benefit from the limited resources available
- Be dynamic i.e. keep on re-assessing the triage based on response of actions.
- Be fast as time is vital for handling any emergency/ disasters.
- Be evidence based for making decisions.
- Be acceptable to the experts present.

The **START** system classifies a casualty's treatment category by assessing his respiratory, circulatory (perfusion) and neurological (ability to obey simple commands) status. The injured persons should be treated and evacuated as follows:

- **Deceased (BLACK tag):** They are left and evacuated in the last. A person is triaged "DECEASED" if he is not breathing and without pulse and an effort to open the airway has been unsuccessful.
- **Immediate or Priority 1 (RED tag):** They are evacuated first as they have critical condition and would die without immediate assistance e.g. severe head injury or severe burns.

- **Delayed or Priority 2 (YELLOW tag):** They are evacuated only after all IMMEDIATE persons are transported. These people are in stable condition but require medical help within an hour or so.
- **Minor or Priority 3 (GREEN tag):**They are not evacuated until all IMMEDIATE and DELAYED persons have been evacuated. They may or may not require advanced medical care after several hours. These people are able to walk and need only bandages etc. **Remember to re-triage in case the condition worsens.**

START SYSTEM (SIMPLE TRIAGE AND RAPID TREATMENT)



Disaster

Disaster is a serious disruption of the working of a community causing such huge loss and damages to the lives, material, economy or environment that the affected community cannot cope with its own available resources.

A **hazard** is any agent that can cause harm or damage to humans,

property or the environment e.g. wires, poles, water ponds or staircases in schools. **Risk** is defined as the probability that exposure to a hazard will lead to a negative consequences. A hazard poses no risk if there is no exposure to that hazard.

Hazards are classified into three modes:

- **Dormant**—this hazard is currently not affecting the environment, but may affect in future e.g. an unstable hillside may cause a landslide, but currently there is nothing below or on the hillside that could be affected.
- **Armed**— this hazard is a potential harm e.g. building with big cracks.
- **Active**—this hazard" is usually called as an accident, emergency or disaster e.g. a harmful incident involving the hazard has actually occurred.

Types of Disaster

There is no place that is immune from disaster. They cause immediate impacts on human life, health and resources and then secondary impacts causing further deaths, sufferings, disrupted services and businesses and bring economic and social costs. There are four types of disaster.

- **Natural disasters:** They are caused by natural forces and include floods, famine, hurricanes, earthquakes, volcano eruptions etc.
- **Manmade disasters:** They are caused by human actions and include accidents, riots, terrorist activities, forest fires etc.
- **Technological disaster:** They are caused by technical and industrial accidents and include gas leakage, radioactivity leakage, industrial accidents etc.
- **Pandemic disasters:** They are caused by sudden onset of contagious disease that affects health and causes deaths.

Disaster Management

Disaster Management is to organize & manage the resources and responsibilities for dealing with emergencies. This is to lessen impact of disasters through prevention, preparedness, response and recovery.

- **Prevention:** These are the activities designed to provide protection from disasters i.e. they are the measures to prevent/mitigate the disasters. Most of the disaster particularly natural disasters, can't be prevented, but loss of life, material and injury can be mitigated with good evacuation plans, environmental planning and design standards.
- **Preparedness:** These are the activities to learn methods to effectively face the emergency whenever it happens. It is the main way of reducing the impact of disasters and can be achieved by proper planning, awareness and training to the member of the disaster prone community.
- **Response:** This is a coordinated multi-agency response to reduce the impact of a disaster and its long-term results. Response/ relief activities include rescue, relocation, providing food and water, preventing disease and disability, repairing vital services like telecommunications and transport, providing temporary shelter, emergency health care etc.
- **Recovery:** Once emergency needs have been met and the initial crisis is over, the affected community still remains vulnerable. The recovery activities include rebuilding infrastructure, health care and rehabilitation, developing policies and practices to avoid similar situations in future.

What to do

Disasters cause a very large number of victims with varied injuries ranging from minor to fatal. The victims need to be attended promptly with the available resource, so here **triage is of utmost importance.** In disasters all the victims are under immense trauma and psychologically stressed. Even those who are not physically injured need psychological support. The first aider's approach should be very humane and sympathetic and here comes in to picture the **Psychological First Aid.**

Psychological First Aid

Psychological first aid (PFA) is the assistance to reduce the occurrence of

post-traumatic stress disorder in people, caused by disaster. It is aimed to reduce initial distress and to enhance short and long-term adaptability. In disasters PSA plays a very important role to ease the pressure over the community and speeds up the rehabilitation process. The approach of Psychological First Aid is to:

- Establish contact with the victim
- Ensure safety to the victim
- Stabilize the condition and victim.
- Gather information about victim's current needs and concern.
- Provide assistance in needs and concern.
- Connect them with social support i.e. family and friends.
- Provide information on coping with the situation
- Link them with collaborative and support services.

Components of Psychological First Aid

Create a Sense of Safety: means tell the person that the stressful situation is over and the things will be better now onward by:

- Reducing chaos and removing victims from the danger.
- Showing evidences of safety.

Create calm: means remain calm both before and while attending the person by:

- Calming yourself and the victim.
- Emphasising on the present situation, practical approach and possibilities.

Create self and collective efficacy: means make collective efforts for best output by:

- Involving the victims in problem solving, self-care and rescue.
- Recognising and reminding people of their existing strengths.

Create connection: means make understanding and compassion with victims by:

- Building an understanding with the victims.
- Helping people connect with friends, family and loved ones.

Create hope: means be optimist and create hope among the victims by:

- Giving specific, accurate, positive facts and making predictable, realistic steps.
- Personally maintaining and communicating hope.

What to do

The first aider must be very polite, full of patience and compassionate. A first aider should not assume anything but must listen to the victim. It is a duty of first aider to maintain the privacy and respect the dignity of the victims. The first aider must keep a record of all the victims and forward it to the authorities, so that further rescue and relief work may be extended to the needy people. The first aider need to perform the following to provide effective and systematic support to the victim. These actions are complementary to the components of psychological first aid i.e. how to work on field.

Approach the Individual

- Approach the victim and introduce yourself and your organisation.
- Find a safe and private place to talk.
- Be very polite and soft.

Stabilize the emotions

- Talk in warm and calm tone. The person may be in shock so you may have to repeat yourself manytimes .
- You may suggest the victim to talk slowly and take a deep breath.
- Ask permission before touching the victim.

Serve the needs

- Ask the victim about his needs and concerns, don't assume yourself.
- Ask for practical support e.g. blanket, water or food.
- Help the victim in finding his family and friends even pets.
- Take extra care of children and elderly persons.

Inform the facts

- Tell exactly about the incidence and about the rescue and relief works going on.

- Be honest, if you don't know about something, tell straight away.
- Never make false promises.

Support the story

- Respect the privacy/feelings of the victims. Avoid personal questions or re-count the trauma.
- Allow the victim to express/practice his religious and other concerns about the incidence.
- Let the casualty cry or remain silent, if he needs to.

Direct to further services

- Ask the casualty to move to further relief services. If he is not ready yet, don't force.
- Give contact numbers to the victim for further assistance.

The above systematic actions bring a lot of relief and confidence in the victim. Remember, PFA is an on-going process till the rehabilitation of the victims for a normal life routine is restored.

CBRN (Chemical, Biological, Radiological and Nuclear) Disaster

The world is constantly under immense pressure and threats from natural as well as manmade disasters. Most of the manmade disasters especially CBRN disasters can be subsided or even completely avoided by proper management and wise decision making. The CBRN disaster can be due to accidental spread or intentional usage of Chemical, Biological, Radiological and Nuclear agents for the destruction of humans, flora, fauna, agriculture and environment.

The CBRN warfare known to have enormous lethal and destructive potential may become preferred weapons over conventional weapons especially for the terrorists to create panic and mass destructions. In present time the knowledge of CBRN disasters and how to handle situation in such disasters is very necessary for everyone particularly for rescuer/ first aiders/ relief workers.

Chemical Disaster

Chemical disaster may be due to accidental release or by the usage of chemical agent/weapons. The term **Chemical Weapon (CW)** is applied to any toxic chemical or its precursor contained in a delivery system e.g. bomb or shell that can cause death or health hazards due to its chemical action. Some toxic chemicals are utilised globally in industry as basic raw material, fumigants, herbicides or insecticides, so easily available. The toxic component of a chemical weapon is called its **chemical agent.** Based on their route of penetration and effect on the human body, chemical agents have several categories as under:

Blister Agents

Blister agents or vesicants, are one of the most common CW agents. These oily substances enter into human body via inhalation or through skin. They cause blisters like serious burns, affect the eyes, respiratory tract and skin and then act as a cell poison. Some blister agents are: **Sulphur Mustard (code -H, HD); Nitrogen Mustard (code – HN); Lewisite (code – L); Phosgene oxime (code – CX)**

Blood Agents

They are distributed via the blood and generally enter the body via inhalation. They inhibit the ability of blood cells to utilise and transfer oxygen which cause suffocation. Some blood agents are: **Hydrogen Cyanide (Code-AC); Cyanogen Chloride (CK); Arsine (SA)**

Nerve Agents

They are absorbed through the skin or via inhalation and affect the transmission of nerve impulses in the nervous system. A nerve agent

uses symptoms like salivation, running nose, weakness, convulsions, urred speech, hallucinations, pressure on the chest and breathing oblem. Some nerve agents are: **Tabun (GA); Sarin (GB); Soman (GD); yclosarin (GE, GF).**

ychotomimetic Agents

ney usually enter body through respiration and cause conditions milar to psychotic disorders including acute confusion, hallucination terioration in consciousness and even coma. Some examples are **sergic acid Diethylamide (LSD) and 3-Quinuclidinylbenzilate (BZ)**

xins

ese are specific poisons produced by living organisms e.g. bacteria, ngi, algae and plants.

- **Botulinum** toxin produced by the bacteria **Clostridium botulinum,** is the most poisonous substance known. These bacteria grow on poorly preserved food and cause severe food poisoning called botulism. After incubation period of 1-3 days the victim has stomach pains, diarrhoea, blurred vision, giddiness and muscular weakness. Lately, respiratory muscles become paralyzed which leads to dead.
- **Ricin** a poisonous protein can be extracted from the **seeds of castor oil plant.** It blocks synthesis of proteins in the body causing low blood pressure and death by heart failure
- **Saxitoxin** is synthesized by a type of blue-green algae, **cyanobacteria** which provide food for different shellfish, e.g. mussels. This is harmless to mussels, but human beings who later eat the mussels may become seriously ill. Saxitoxin attacks the nervous system and has a paralyzing effect and high dose can cause death within 15 minutes.

nat to do in Chemical Disaster

oper management with planning and prior training is of utmost portance in handling any disaster. The important guidelines to ndle chemical disaster are enumerated below.

❖ Evacuation

It is important to act quickly and follow the instructions of local authorities as they know about the chemical used for the disruption. Every situation can be different, so local authorities could give special instructions to follow for a particular situation. If you are in the open and in close proximity during an actual chemical release; stay calm and move as quickly as possible to a safer area upwind of the danger area. Do not shelter in a vehicle unless no other choice, as vehicles are not airtight

❖ Shelter

In case of chemical disaster immediately get into a shelter to avoid exposure to the lethal chemical agent. The first thing is to get away from the danger and prepare yourself for further action.

- Go inside shelter as quickly as possible with pets. Higher floors are better to avoid vapours that sink.
- Room must have emergency kit, food, water supply and medicines.
- Seal the windows, doors or any opening like chimney with duct tape, cardboard etc.
- Remove any contaminated cloths and wash the body properly.
- Keep away from any fumes and use mask/ wet cloth as required.
- Turn off the fans, air conditioner or heater.
- Sink and toilet drain traps should have water in them.
- Drink stored water not the tap water and eat only covered food.
- Turn on the radio/ TV for instructions and updates.
- Keep a telephone handy.
- Stay calm and reassure others.

❖ Decontamination

It is necessary to remove and dispose contaminated clothing immediately and wash the body properly. If hair is suspected to be contaminated then it must be shaved off. Eyes must be rinsed with water for at least five minutes. Decontamination prevents the chemical from being further absorbed/ spread in/ on the body and also prevents the chemical from spreading to other people.

ole of First Aider/ First Responder

- Don't move out of shelter unless advised by authorities and always wear proper **PPE (Personal Protection Equipment).**
- Help people to evacuate and getting shelters.
- Decontaminate and educate people.
- Treat and dispose causalities as per instructions or Triage.
- Provide **antidotes** to the affected as well as unaffected peoples.

ological Disaster

ological disaster is mainly caused by biological weapons i.e. the eliberate spreading of disease amongst humans, animals, and plants. ne **Biological weapons (BW)** introduce a bacteria, virus or icroorganism into an environment for hostile purposes. Thus, after cubation period the disease outbreaks and the effect of BW disease n continue though secondary infection by an infected person. There e a huge variety of genetically or traditionally modified bacteria and uses to withstand antibiotics that could be used as biological eapons. Some of the BW examples are:

V used on Humans

- **Bacillus anthracis:** A lungs infection starts with influenza like symptoms but within 3-7 days a lethal hemorrhagic chest inflammation occurs having 90% death rate in untreated patients.
- **Rickettsia rickettsii:** It causes red/purple rashes with fever, nausea, vomiting and in severe cases causes respiratory, nervous, gastrointestinal or renal system problems.

- Other examples are **Yellow fever virus, Ebola virus, Japanes encephalitis virus** etc.

BW used on Livestock

- **Aphthae epizooticae:** This virus causes **Foot and Mouth diseas** in hoofed livestock. The fever is followed by blister inside th mouth and on the feet that rupture to cause lameness.
- **Rinderpest virus:** This virus causes **Plague disease in cattle.** It i highly communicable with fever, oral erosions, diarrhea and high mortality.
- **African Swine Flu Virus** and **Psittacosis/parrot fever** in parrot pigeon, sparrow, duck, hen etc.

BW used on Agriculture

- **Magnaporth egrisea:** This fungus causes **wheat/ rice blas** diseases in wheat/ rice crop.

What to do in Biological Disaster

The biological disasters cause fast spreading epidemic/pandemi diseases which cause severe health problems and high number c deaths. The strategy to tackle this disaster includes the followin measures:

- **Isolate** affected peoples/ animals from other peoples/animals t stop the spreading of infection.
- **Use Protective Masks and PPE** as they are capable of blockin bacteria, viruses and spores from entry into the wearer's nas passage. Further, **personal protection equipment (PPE)** i.e protective over garments including goggles, boots and glove prevent entry of microbes' through breaks in the skin.
- **Decontaminants** e.g. chemicals, heat, UV rays can neutraliz biological agents in infected areas.
- **Sensors** are used to detect the presence of biological agents the air, water or on surfaces.
- **Vaccines** are very effective in fighting against Biological agen but are of limited use if a huge population is already infected ar

if genetically modified agent is involved. A huge stock of vaccines must be readily available. Sometimes for a new BW or microbe vaccine may not be available.

- **Educating** people about the disease, its prevention and precautions to be taken, especially educate people to keep distance from others to avoid infection.

Role of First Aider/ First Responder

- Keep yourself protected with PPE.
- Isolate the patients with communicable diseases and provide medical help.
- Provide necessary first aid and assistance to people as per instructions or Triage
- Decontaminate and educate people.
- Provide vaccines to the people.

Radiological Disaster

A radiological disaster is an emergency in which there is a hazard due to radiation from a source. As sources of radiation are used in various fields including industry, medicine and research, radiological emergencies may occur anywhere.

What is radiation

Radiation is energy travelling through space. Sunshine is one of the most familiar forms of radiation delivering light and heat. There are many higher energy radiations which are used in medicine or which we

all get in low doses from space, air, earth and rocks. Radiation is classified as **non-ionizing** or **ionizing** radiation.

- **Non-ionizing radiation** is of longer wavelength, lower frequency and lower energy e.g. near ultraviolet, visible light, infrared, microwave, radio waves etc. It does not penetrate deep into the tissues but increases the risk of damage to the skin and eyes. A long exposure can cause localised heating and possible permanent harm so exposure should be minimised.
- **Ionizing radiation** is of short wavelength, high frequency and higher energy e.g. far ultraviolet light, X-rays, gamma-rays, and all particle radiation from radioactivity. It is dangerous as it usually causes one of the three things in the cells viz. the cell death, the cell repair or incorrect mutation of the cell and the resultant cell can become cancerous.

Cosmic rays and the decay of radioactive isotopes are the primary sources of natural ionizing radiation on earth referred to as **background radiation.** It is naturally and inevitably present in our environment but we don't feel this radiation, as we have evolved in this environment. People living in granite areas or on mineralized sands receive more **terrestrial radiation,** while people living at high altitudes receive more **cosmic radiation.**

Our total background radiation includes 42% from radon gas (seeps from the earth's crust); 18% from buildings and ground; 11% from food; 14% from cosmic rays and 15% from artificial sources like medical radiations.

Radioactivity in material

Most atoms are stable but certain unstable atom owing to their excess internal energy, change or disintegrate spontaneously **(radioactive decay)** into totally new stable atoms and are called **radioactive.** This property of spontaneous disintegration of the atoms of the material is called **radioactivity.** The radioactivity of radioactive material is measured in **Becquerel** (Bq). A **Becquerel is one atomic decay per**

second. Each atomic dis-integration produces some ionising radiation.

Ionising Radiation – alpha, beta and gamma

Ionising radiation comes from the nuclei of atoms which emit excess energy as **gamma, beta and alpha radiation,** till it reaches a stable state where it is no longer radioactive.

- **Alpha radiation:** They have **little penetrating power** and can be stopped by the first layer of skin or a sheet of paper. But inside the body they can produce more severe biological damage than other types of radiation.
- **Beta radiation:** They have **considerable penetration,** up to 1 to 2 centimetres of water or human flesh. They can be stopped by a few millimetres thick sheet of aluminium.
- **Gamma radiation:** These rays have **great penetrating power** and can pass through the human body. A slab of concrete, lead or water is used as protective shield.

The effective dose of this radiation is measured in a unit called the **Sievert,** although most doses are in MiliSieverts (mSv). We receive about 2 mSv per year from background radiation, and some more from medical procedures. Anything less than 100 mSv is harmless. As such 1 Sievert mildly affects blood composition; 2 Sieverts can cause considerable sickness and 4 Sievert is lethal.

Examples of Radiological Emergency

The radiological emergency can be of many types depending on the source, intensity, exposure etc.

- Leakage from a nuclear reactor or nuclear facility.
- Loss or theft of a dangerous source i.e. radioactive material
- Public radioactive contamination due to exposure.
- Accident during transport of radioactive material
- Detection of radiation levels at some place by known or unknown source.
- Blast or detection of an explosive Radiological Dispersal Device (RDD) or Dirty Bomb. It is a device used by terrorists to spread radioactive materials using explosives.

How a radiological emergency can be detected

The radioactivity can't be seen or sensed with our senses so the presence of a radiological hazard is detected by observations or information of a potential radiological emergency that include:

- Suspected or actual bombs or devices .
- Signs of possible contamination e.g. spillage
- Radioactive source that is lost, stolen, damaged or potentially involved in a terrorist act.
- Elevated radiation levels indicated by a radiological assessor.
- Symptoms of radiation injuries e.g. burns without cause.
- Damaged devices or equipment used for medical and research purposes.
- Credible threats or threatening messages.
- A heavy container with the radiation symbol or package marked as - IP, A, B, C, LSA (low specific activity) or SCO (surface contaminated object)

Suggested Radius of Inner Cordoned Area for Radiological Emergency

In case of radiological emergency area around the source of radiation/ suspected radiation must be cordoned to avoid exposure of radiation to the people. No body except authorised persons must be allowed to enter the cordoned off area. The recommendations are as given below.

In open

- Unshielded or Damaged potential source : 30 M radius
- Major spill from a potential source : 100 M radius
- Fire, explosion or fumes from a potential source : 300 M radius
- Potential RDD exploded or unexploded : 500 M radius

Inside a building

- Damaged, unshielded potential source : Affected and adjacent floors
- Fire etc. involving a potential source : Whole building/ surroundings

Signs and Symptoms of radiation exposure

- Sickness without any disease or reason.
- Burns without any apparent cause.
- Headache, Dizziness, Nausea, Vomiting and Diarrhoea.
- Suspicions expressed by the patient that some 'object' was making him sick.
- Patient from a profession where there is an increased risk of radiation.
- Identification of persons through medical examination that have been exposed to radiation.

Role of First Aider/ First Responder

- Promptly take actions to protect the public from radiological and psychological health effects.
- Completely cover yourself with recommended PPE.
- Cordon off the area as advisable.
- Keep people outside inner cordoned area
- Conduct rescue/ operations as per time given to limit the radiation dose intake (each rescue worker can remain inside the cordoned area for a limited time only).
- Decontamination by removing cloths and shower in decontamination shower if required.
- Protection from ingestion of radioactive particle in case of fire/ blast/ fumes by using masks etc.
- Make sure the radiation does not go out due to external contamination i.e. cloths.
- Make the triage/first aid area outside the inner cordoned area.
- Send the infected persons to designated and equipped hospitals, as per triage.
- Serious patients may be sent to hospital without decontamination but after removing their outer cloths and wrapping the patient in plastic bags.
- Get briefed and informed by the authorities.

There is little or no health hazard to the medical/ first responder staff

treating or transporting exposed or contaminated people provided they use proper Protective Suits. Radiation induced cancers or genetic disorders may happen only when very high doses are absorbed for a long period.

Nuclear Disaster

A nuclear disaster may be accidental or intentional. The **accidental disaster** e.g. nuclear reactor leakage may be controlled and it can rarely cause catastrophic effects. While **the intentional disaster** i.e. **Nuclear Weapon** is an explosive device that derives its destructive force from nuclear reactions. A nuclear reaction by a nuclear weapon releases about a million times more energy than a chemical reaction, making it extremely powerful than conventional weapons. The second major difference is that a nuclear explosion produces large amounts of deadly rays of nuclear radiation. The energy of a nuclear explosion is released in the form of **(1) Blast wave (2) Thermal radiation (3) Nuclear radiation,** each causing devastation on a scale that is unimaginable. The distribution of energy in these three forms is roughly as 50% blast, 35% thermal and 15% nuclear radiation.

Blast Wave

Because of the very high temperatures and pressures at the point of impact, the gaseous residues of the explosion move outward to create a blast wave travelling several times faster than sound. A 15 kiloton weapon creates very high pressure area and **wind speeds in excess of 800 km per hour** up to about a 1.2 km radius, causing most buildings

demolition and there will be almost no survivor. Beyond this distance and up to about 2.5 km the pressure gradually drops and the wind speed comes down to about 150 km per hour causing injuries and deaths on a large scale. Beyond this zone the pressure drops but still enough to shatter windows and cause serious injuries.

Thermal Radiation

Thermal effects hold the greatest potential for environmental damage and human deaths. The tremendous amount of energy released in a nuclear detonation generates temperatures of tens of millions of degrees Celsius develop in the immediate area of a nuclear detonation. In a 15 Kiloton weapon, everything up to 500 meters near ground-zero will vaporize and almost everyone within 2 km will suffer third degree burns. There will be almost no survivors since no immediate medical attention will be available. The remaining gases of the weapon, surrounding air and other material form a fireball which grow rapidly and subsequently expand to give the appearance of the familiar **mushroom cloud.** The nuclear firestorms can create millions of tons of smoke which will rise into the stratosphere causing **global cooling** by blocking sunlight. .

Nuclear Radiation

Radiation emitted at the time of detonation and occurring within the first minute is known as prompt or initial radiation. Anyone close enough to the detonation to be killed by **prompt radiation,** is likely to be killed by blast and thermal effects. So most concerns about the health effects of radiation focus upon the **residual or delayed radiation,** which is caused by vaporized debris and soil contaminated by radioactivity falling over a vast area creating radioactive deadly fallout with long-term effects. The smaller particles will rise into the stratosphere and be distributed globally while the larger particles will settle to Earth within about 24 hours as local fallout.

Electromagnetic Pulse or EMP

The ionizing radiation from the fireball produces intense currents and electromagnetic field known as electromagnetic pulse (EMP), **more**

powerful than lightning. A single high yield nuclear detonation will create destructive EMP over thousands of square kilometres. Modern micro-chips and microprocessors present in most communication equipment TVs, radios and computers etc. will immediately get burnt out. Thus all communication links to the outside world are cut off.

Long Term Effects of Nuclear Disaster

- It cause **Damage to DNA** and disrupt metabolic and replication processes of cells.
- Ionization radiations would cause **infertility** in humans and babies born with **deformities.**
- Affected people stand 80% more risk of contracting **cancers**
- Absorption of sunlight by a global smoke layer would cause **Ice Age temperatures on Earth.**
- The **land will be infertile** for tens of years or even more.
- Around 40% of the smoke would stay in the stratosphere for 10 years and would also **destroy much of the protective ozone layer** to cause **health and environmental hazards.**
- The devastation of environment will cause **deaths by starvation.**
- The **global economy** will shatter causing misery.
- Immediate treatment would require continual **replacement of blood** to replace the damaged blood cells and treatment of **bone marrow and lymphatic tissues as** they are the most sensitive to radiation. The medical facilities will be stressed and will crumble.

What to do

A war can turn into a nuclear disaster, whether it happens or not but one must be ready for the worst. There are certain guidelines which need to be followed in case of nuclear disaster.

Psychological Preparations

Provide information and educate what people should be doing to lessen the terror and confusion after an unexpected nuclear attack. This can be done using televisions, radios, print media, organising sessions and mock drills etc.

Physical Preparation

In case of information of a suspected nuclear attack select a shelter e.g. basement or lower level with wash room, ample drinking water, watersupply, non-perishable food, first aid kit with necessary medicines and a good survival kit..

Survival Kit: Torches with extra batteries, Match boxes, Candles, Knife, Blades, Tapes, Ropes, Whistle, Compass, Water purifier gear or chorine tablets, Mug, Head lamp, Oil lamp, Packets of high energy food, Polybags, Papers, Pen, Copies of Identity cards and important documents etc.

- Pack electrical devices in cartons and cover with aluminum foils to protect from EMP.
- Learn about types of bombs, radiations and what to do in case of disaster.
- Keep eyes on news for the latest happenings and guidelines.
- Stay calm and indoors till the instructions are given by the authorities.

Warnings and Communications

It is certain that Warning Signal/ Siren would give sufficient time for most people to reach nearby shelter in time. It is very important to give proper attention to warnings and communications.

Evacuation

These days the bombs are loaded on very accurate missiles so unless your home is closer than 15 Km. from the nearest probable target, you need not evacuate to avoid blast and fire dangers. Evacuation relevant to fallout radiation may be needed as per directions.

At the time of explosion if you are near the site **"duck and cover"** is still a worthwhile exercise as such it has nothing to do with preventing radiation or fire injures, but will avoid injuries from flying debris. Another thing is to **keep mouth open to save the eardrums** bursting from the pressure. To minimize effects of thermal blast remove cloths made of flammable materials and move away from flammable

materials. To avoid radiation contaminations remain fully covered and keep nose and mouth covered with wet cloth.

If you survive the original explosion, you now have around **10 to 20 minutes to get out of the way** before a lethal amount of radiation comes down from the **mushroom cloud.** In those minutes try to go about a 2 Km. away from the blast. If you can't move away then get into a shelter and stay there.

Shelter and Survival

Shelter means a basement as deep as possible or in case of ground burst explosion floor higher than ninth floor. It is important to **reinforce the walls, windows and doors** of the shelter. Shelter should be kept cool since it will become dangerously hot in a few hours. **Protection against fire** and shelter **sanitation** like control of insects and disposal of human waste will be crucial for survival.

The most hazardous **fallout particles** are readily visible as fine sand-sized grains so must keep away from them and **remain indoors for up to 10 days** or as advised by the authorities. Keep doors and windows closed. Layers of **clothing** are effective in reducing radiation effects. Switch on Radio/TV and look out for announcements from local authority.

Cover all food, water and **consume only such covered items.** A basic **nutritious vegetarian diet** will be the best. An **oil lamp** must be included along with **torch and whistles.** Since there may be no **medical help** so wise use of preventive **medicines** and general health care will be crucial. Stay calm and assure others. Don't believe in rumours and **obey all instruction** from the authorities.

Antidotes

There are certain antidotes to neutralize/ minimize the effects of radiations caused by the nuclear weapons. These can be taken before or after the explosion if one is suspecting radiation exposure.

- **Prussian blue**(10 Radiogardase capsule) is used as an antidote for

heavy metal poisoning, e.g. **for thallium and radioactive isotopes of caesium.** An adult can take 10 g of Prussian blue per day without serious harm.

- **Potassium Iodide** tablets are used to cure radiation poisoning due to short-lived fission product Iodine-131.
- **DTPA (Diethylenetriaminepenta-acetate)** comes in two forms viz. calcium (Ca-DTPA) and zinc (Zn-DTPA). They work by binding to radioactive **Plutonium, Americium and Curium** and then pass them out of the body through urine.

Stages of Nuclear disaster

- **Initial stage (first 1–9 weeks)** will have the greatest number of deaths, with 90% due to thermal injury and/or blast effects and 10% due to super-lethal radiation exposure.
- **Intermediate stage (from 10–12 weeks)** in this period most deaths are from ionizing radiation in the median lethal range.
- **Late period (from 13–20 weeks)** this period has some improvement in survivor's conditions.
- **Delayed period (from 20+ weeks)** is characterized by numerous complications, mostly related to thermal and mechanical injuries. The over-exposure to radiations is coupled with infertility, blood disorders and dying of cancer later in lives. The lesser problems such as minor effects in tissues/organs creeps in and Genetic disorders appear in later period.

Role of First Aider/ First Responder

- Prepare yourself and spread the information about how to survive during such disaster
- Protect yourself and the people in the shelter, till advised to move out
- Once the radiation levels are down and declared safe to move out, the relief workers may extend their services for rescue, relief work and symptomatic treatments with proper precautions. Helping one another with compassion will be the key during such emergency.

It is in the interest of entire humanity that no CBRN warfare ever be used in any war or disruptive activity. A disaster caused by CBRN will immensely increase the sufferings to the human race and will overshadow the future of the life on the earth. The only solution is peace, harmony and mutual understanding among all the nations.

Pictures of Improvisation in First Aid

Suggestive illustrations of improvisation is given below to showcase best use of available resources in case of an emergency.

Notes

Notes

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